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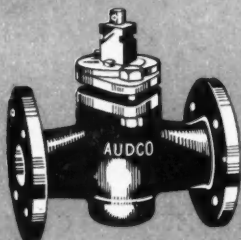
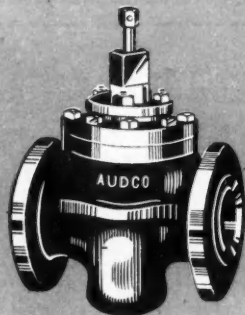
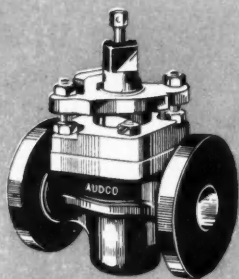
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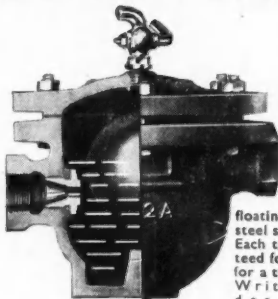
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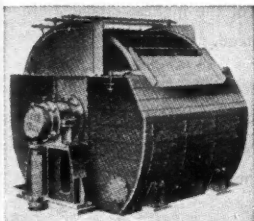
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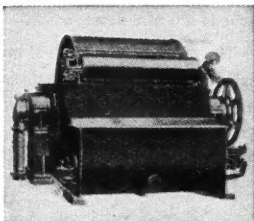
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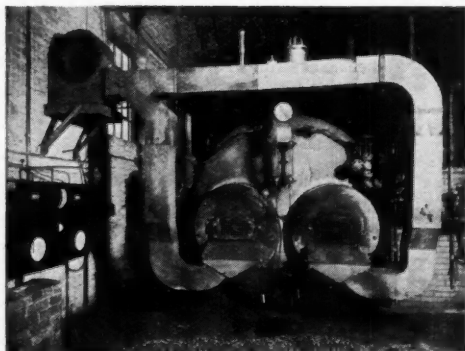
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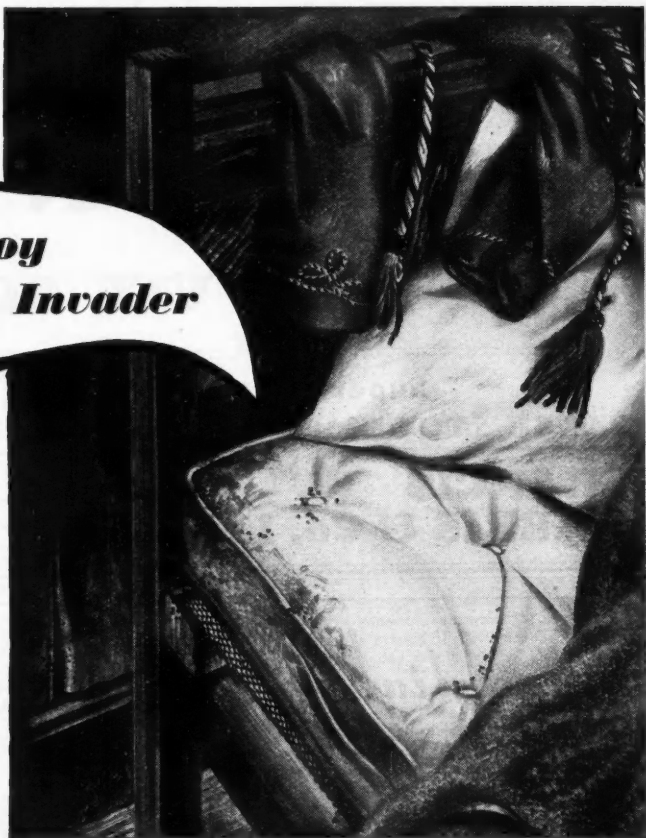
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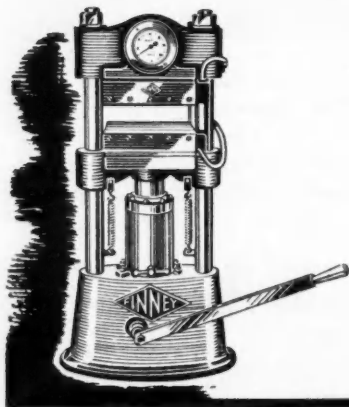
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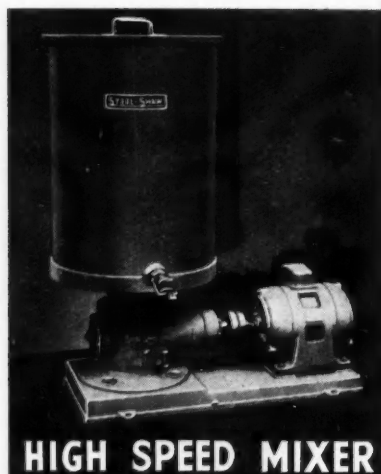
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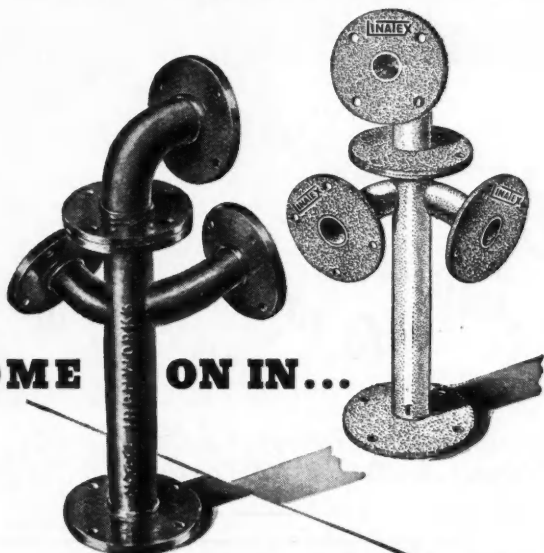
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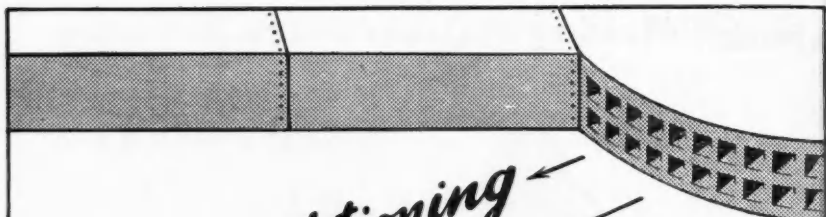
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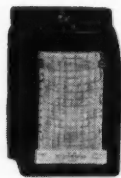
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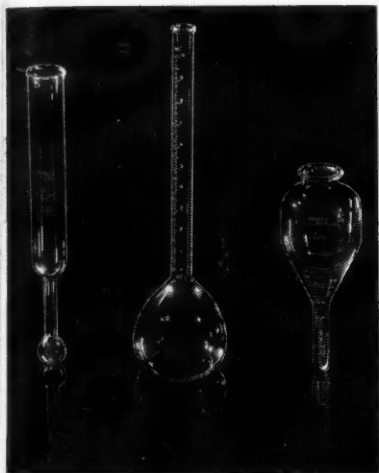
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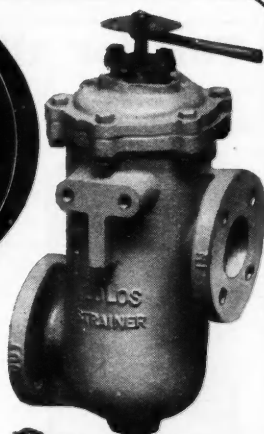
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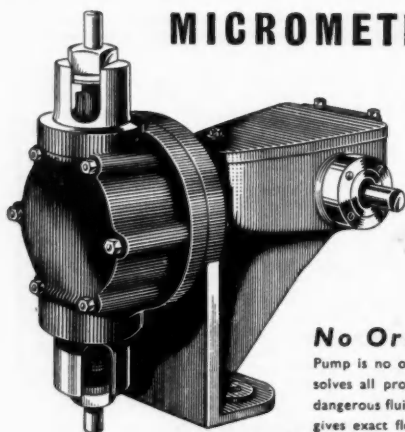
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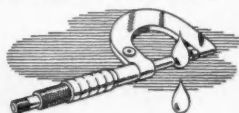


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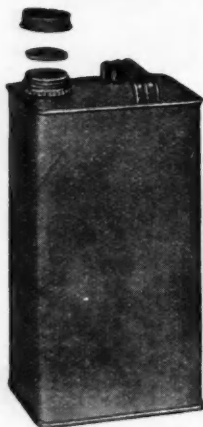
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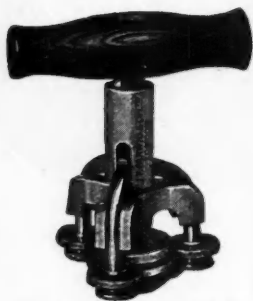
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Tins for all Trades Home & Export



Square can showing patent screw neck.
Patent No. 382,380



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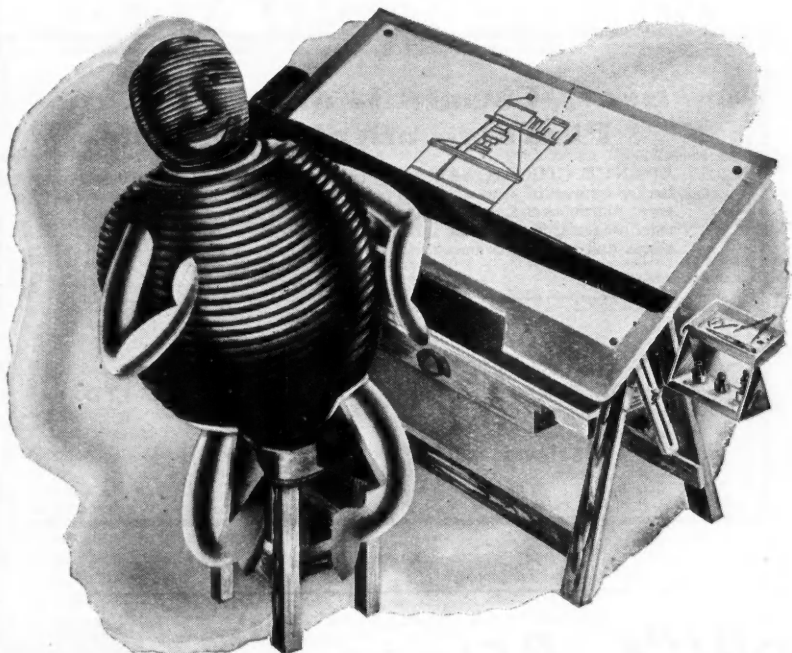


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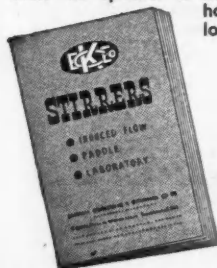
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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Bann Brothers Limited

VOL. LVIII
No. 1506.

22 May 1948

Annual Subscription, 26s.
8d. per copy; post free, 10d.

Inexpert Control

THE close relationship between industry and Government is becoming one of the basic facts of contemporary affairs, one with which everyone who enters into an industrial project must reckon. This change has occurred almost entirely during the present century, and has been due to the increasing industrialisation of the world, coupled with a standard of living which has led to social consequences of the highest order. At the one extreme stood the Victorian business man who minded his own business and did not allow anyone to interfere. At the other extreme stands the Communist State which regards business as a department of State to be controlled and directed in accordance with Government dictates. We are some way between these two "ideals," but under present conditions we are approaching each year more closely to the extreme marked by the Communist State.

Trade associations are one means whereby Government can direct industry. Through such organisations the Government can readily convey orders to a whole industry and can make convenient arrangements for control of production, raw material, labour, financial policy, and sales policy. It is not surprising, therefore, that the Federation of British Industries, which is representative both of trade associations and individual firms, has the most complete first-hand knowledge in the country of the working of Government control of industry. The speech given by Sir Frederick Bain at the general meeting of

the FBI was accordingly of peculiar interest, not only because of his intimate connection with the chemical industry but because, as president of the FBI, he has the opportunity of seeing the game from the middle.

Sir Frederick sees clearly, more clearly we believe than most of the ministers of the Crown and Government departments, that the most essential need of this country is to equip its industries with modern tools, modern plant, and modern methods. How to do that is, of course, one of our greatest problems. It involves, among other considerations, the necessity of first educating industry generally in the use of new methods, and of making management, particularly boards of directors, understand the advantages that can be gained by ringing out the old and ringing in the new. We do not say this in any spirit of criticism of present management. The point is that it is not always easy to keep abreast of modern developments in a world which rushes on so breathlessly as our own and under conditions which leave so little time for the individual to keep himself abreast of modern thought and achievement.

At present, the more obvious difficulty in achieving the objective is that in order to secure essential raw materials and food we must export a considerable amount of our output not only of manufactured goods, but also of capital equipment. Sir Frederick Bain has pointed to the Marshall plan as the only method immediately avail-

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able whereby this re-equipment can be performed quickly, and expressed the situation in a telling phrase: "American aid will be the test and temptation of the British." To this he should have added the word "Government," in view of the way in which the earlier American loan was spent.

The fact is that, although three years have passed since war ended, we are still unprepared and ill-equipped. The Economic Survey for 1948 has admitted that without American aid we should be compelled to cut consumption and employment and to abandon many of our development plans. The fact that we have promise of this American aid on a vast scale is a challenge to use the period of recovery in self-help, and that cannot be done better than by using it to re-equip our industries on modern lines. To quote Sir Frederick Bain: "Capital equipment and machinery has been one of our most valuable exports, but the industries of this country have gone short. . . . Our policy must be a long-term one. . . . The Government must adapt its export policy, industry must be allowed to arm itself to meet the competition of the world. . . . The efficiency of our industry at home must not be sacrificed for temporary comfort, for this will be at the cost of our own future."

The need to replace compulsion by voluntary methods was urged over and over again. The compulsory methods which this Government has adopted has left

British industry so tied that it cannot move to manufacture the smallest article or piece of plant without becoming involved with a whole system of Government licensing and control. "To ensure the correct use of materials, we have system of licensing. To deal with evasion created by the licensing restrictions we have authorities to manufacture. To force the manufactured goods on to export markets we have purchase tax to restrict home demand, and licensing systems tied to export sales. We have price controls to keep prices down; but they have in some cases kept prices up, because of the way in which they encourage inefficiency. So price control leads in turn to high profits by the efficient, and to counter this we have a profits tax. Each new problem has been met by fresh statutory restrictions leading to still more restrictions to stop up the leaks disclosed by the first, and to grapple with the evasions set in motion by the wall of restrictions."

Against this background, which can only lead to a deplorable state of disunity and which is handicapping initiative everywhere, the FBI has made deliberate move towards a voluntary method. Among these has been the establishment of the Economic Planning Board, the negotiation of export targets, the voluntary curtailment of expenditure on plant and machinery, the voluntary reduction in the amount spent on advertisements, and the voluntary

(Continued on page 704)

NOTES AND COMMENTS

Good Omen

THE resignation last week by Sir Charles Reid of his production directorship of the National Coal Board has come to rank as one of the more constructive actions in the recent annals of that much criticised organisation. Paradoxical as that may appear superficially, the revival by one of the principal executives of the nationalised industry of the time-honoured method of registering dissent from prevailing policy has indicated that the doctrine of expediency is not as widely accepted as has appeared. There is also little doubt that the simultaneous announcement of the Government's intention of setting up a committee "to advise the Board whether any improvements can be made" would not have been heard had Sir Charles Reid been content to make a bargain with his principles. The investigating committee and its chairman, Sir Robert Burrows, if they are endowed with the courage of the retiring director, have now the opportunity of performing for coal mining, and indeed for almost every other industry in the country, a greater service than any lately provided at the Government level. If they can help to relax from the mining industry the bureaucratic stranglehold which has magnified costs and withheld supplies—while affording no satisfaction to the miners—they may join the honourable company of their country's practical benefactors.

Free Publication Preferred

NEXT month the Royal Society is to hold a Scientific Information Conference in London, to be attended by men of science from the British Commonwealth and the U.S.A. Among subjects to be discussed is a provisional scheme—of which the author is Prof. J. D. Bernal—for "Central Distribution of Scientific Publications," which in effect is also concerned with publication. As far as can be judged from preliminary drafts of the scheme, the professor appears to advocate the setting up of "National Distributing Authorities," whose functions would be to receive scientific papers and delegate to appropriate panels authority to approve, censor and otherwise act as arbitrary judges of whether a particular paper should be published and how and where. Such proposals, we submit,

would conflict with the evident right of scientists to choose their own mediums for dissemination of knowledge, and in the long run create delays in publication. Among the many sound objections taken to the scheme by the Society for Freedom in Science, and published in the form of a letter in *Nature*, May 15, by Mr. G. P. Thomson and Mr. J. R. Baker (president and hon. secretary respectively) is that "no single person or committee should ever be able to prevent the publication of any scientific paper." We do not believe for one moment that such a scheme, even if accepted by the conference, would be workable. Regimentation in any shape or form is abhorrent both to the technical Press and to science, whose debt to "free enterprise" in the past is infinitely greater than any benefit a PRO organisation is ever likely to confer.

Danger Signal

WHATEVER views may be held about a substantial section of contemporary Government publications, the occasional offerings on chemical subjects by the Factory Department of the Ministry of Labour are assured of a good reception from all who appreciate the need to eliminate avoidable hazards for the chemical worker. This is the objective of "Form 814"—abstracts from which appear elsewhere in this issue—and, while what it records about the possibilities of explosion or asphyxiation when chemical tanks and stills and similar vessels are being cleaned or repaired is what chemical works executives should know already, the emphasis which it places on the hazards is salutary. Anything capable of kindling a little healthy apprehensiveness to offset the casualness which familiarity with gases such as acetylene, carbon bisulphide and hydrogen is prone to engender renders a very real service. Some of the recommendations relating to the exclusion of naked flames are, of course, matters for elementary prudence, but some of the other risks to which attention is called are of an insidious kind which even the expert chemical engineer might possibly overlook. The necessity for earthing some pipelines is certainly not so obvious as is the same precaution when dealing with electrical circuits; yet the passage of air, dry steam,

hydrocarbons and some organic fluids is capable of accumulating a static charge which in a suitably explosive atmosphere may produce disastrous results as readily as a powerful charge for the electricity mains. The risks associated with acids and similar material have already been fairly fully documented by the Chemical Works Regulations, 1922, and publications authorised by the Chief Inspector of Factories; but there remain a host of lethal possibilities which have never been accorded the same scale of publicity, such as the generation of deadly nitrous fumes from atmospheric nitrogen when an acetylene flame impinges on metal. Because it raises the verbal equivalent of the death's head and crossbones in these and several less obvious directions Form 814 deserves well of chemical works managements. It deserves in fact to be read—more than once.

B.I.F. Results

IT needed no gift of clairvoyance on our part to foretell (*THE CHEMICAL AGE*, May 8) that import and currency restrictions were likely to bulk larger than the predominance of sellers' or buyers' markets as factors affecting immediate results of the B.I.F. The inference was obvious in the light of recent evidence from many parts of the world of the extent to which artificial mercantile controls come between the willing seller and the needy buyer. Behind the guarded statements given by manufacturers at the various sections of the Fair there have been many pointers to the fact that the familiar problem was presented this time in a rather more embarrassing form and, while the quip that buyers this year came full of admiration—but without order books was a jocular overstatement, sales in some sections seem likely to fall below expectations when the final reckoning is made. However that may be, the wide presentation this year of the fruits in industry of what is conveniently summed up as "applied science" has deservedly created an impression capable of producing possibly more orders than the industries concerned will be able to handle just as soon as the prohibitions imposed by international retrenchment, abetted now by uncertainty over British official policy on prices, can be overcome. So far as chemical equip-

ment was concerned, these impediments seem to have had little effect, confirming the many recent indications of the world-wide attempts to provide at home some of the chemicals for which buyers, figuratively, still have to queue.

INEXPERT CONTROL

(Continued from page 702).

restriction of prices and profits. To all of these the chemical industries as a whole have given support.

We should be loath to suggest that controls could be removed overnight, but we believe that controls could be increasingly effected on a voluntary basis and that industry is the best agent to operate such controls. Until raw materials and labour become more plentiful there must be some over-riding plan to determine which are first essentials and in which order particular goods should be manufactured. But the sooner we can restore free enterprise and give to all by reduction of taxation some incentive to work, the better it will be for the country as a whole.

Sir Frederick Bain regretted that the Budget "should be disfigured by the introduction of a so-called contribution which introduces a new and evil principle into our system of taxation." At a time when everyone was urged to save, to have introduced a measure which penalised those who have done so was clearly a blunder of the first magnitude and has done nothing to increase our confidence in those in whom are vested the functions of control.

Cement Target 1½ Million Tons

A statement from Mr. Geo. F. Earle, chairman of Associated Portland Cement Manufacturers, which has been circulated with the accounts, says that, following a period when the Government severely limited export of cement, in order to conserve supplies for the home market, the industry was now at liberty to export large quantities. A target of 1½ million tons had been set for the industry and it was hoped to exceed this figure. Up to the end of March exports had been running at the rate of 1.6 million tons a year.

Mr. Earle pointed out that the home market price for cement, net at works, was now only 52 per cent higher than before the war.

Resources Wasted

Scientist's View of Government Policy

B RITAIN could not emerge from the present economic crisis merely by financial rearrangements or harder work. These measures required to be supported by full use of the scientific and technical ability of the country and should form the basis of a general plan for the reorganisation and re-equipment of industry.

These views were put forward by Prof. J. D. Bernal in his presidential address at the annual conference in London of the Association of Scientific Workers.

"Mortgaging Our Future"

Attacking the Government's "hand-to-mouth policy of cutting down capital expenditure, weakening development and hence undermining the hopes of ultimate recovery," Prof. Bernal said that the attempt to balance the external trade of the country, particularly in dollars, by encouraging the manufacture of consumption goods for export and restricting our own capital expenditure would "mortgage the whole future of the country for illusory advantages in the immediate present."

Waste and Inefficiency

The association's research, subsequently confirmed by the studies of various other bodies, including the Parliamentary and Scientific Committee, revealed, he alleged, that in all branches of industry and agriculture there was a large amount of waste and inefficiency. There was only a 20 per cent utilisation of coal and though the utilisation of steel could not be so accurately assessed it was probable that at least 50 per cent was wasted.

Referring to estimates that a 50 per cent increase in output could be achieved by raising the productivity of the poorer firms to the level of the good ones, Prof. Bernal said that the present economic direction did not offer the necessity or the possibility of such a step. Profit margins were so wide that inefficiency was subsidised.

U.S. Monopoly of Basic Industries

Dealing with ERP, Prof. Bernal said that in his opinion acceptance of U.S. aid might mean that European economy would be weakened by becoming complementary to that of America. This dependence might ultimately result in the concentration in Europe and Britain of secondary and finishing industries and the retention of the basic industries in America, together with the main research and development centres.

Tin and Chemical Cartels

Charges in U.S. Survey

A LLEGATIONS that cartel operations played a significant part in the tin and chemical industries before 1939 are made in a survey, "Cartels or Competition," which will be published in the U.S. next month.

The authors, George W. Stocking and Myron W. Watkins, assert that cartels are responsible for high prices, foster inefficiency, deter investment and technical improvements and produce alternate "boom" and depression periods.

Chemical Cartels

In support of the charge that cartels maintain prices at an unnecessarily high level, the writers point out that during 1932, the worst year of the world trade depression, eight of the principal U.S. chemical companies, several of which were members of cartels, earned an average of 6.4 per cent on invested capital. This figure was doubled in 1940 and in the year 1929, when trade was at peak level, they had profits of 15.1 per cent on invested capital. These companies, the authors allege, could not possibly have shown such earnings if their prices had been competitive.

The Tin Industry

The tin cartel is quoted as an example of how the high-cost producer receives protection by its operation. "A comprehensive cartel was organised," say the authors, "after marked slackening in demand and great decline in price during the depression of the early thirties . . . the governments of the major tin-producing countries set up a compulsory output restriction scheme embracing 95 per cent of world productive capacity. Under this arrangement, production of tin in excess of a prescribed quota became a criminal offence." By 1933 the permitted output of the industry had been reduced to one-third of capacity—prices rose from 27 cents a pound to 46 cents a pound. By 1934 they had gone to 56 cents. During the thirties, according to this survey, the tin cartel kept prices high enough to enable nearly all producers to make profits, even with output restricted from one-third to 40 per cent. In addition, the authors claim that the cartel has granted much more liberal quotas to producers in high-cost areas than to others. Through these practices, consumers in effect paid a bonus to keep high-cost tin producers in business.

Finally, the survey suggests that, to operate in conjunction with the E.R.P., judicious policies should now be introduced to prevent cartels in the U.S. and elsewhere curtailing investment and employment.

Petrochemical Expansion

£1.45 Million More from FCI

THE Finance Corporation for Industry is to put up a further £1,450,000 for the expansion of production of chemicals from oil by Petrochemicals, Ltd., which is completing erection of plant near Manchester which was originally planned to produce an annual output of 50,000 tons. Under the new expansion scheme production will be raised to 70,000 tons. Negotiations are not fully completed, but in addition to the amount from the FCI £1 million will be underwritten by a private firm, Robert Benson Lonsdale & Co., Ltd. Part of the money provided will be used to erect plant for the manufacture of styrene and polystyrene, in which Erinoid, Ltd., will be associated and will contribute, it is stated, £300,000. Petrochemicals has had a pilot plant in operation for several years producing aromatic hydrocarbons and olefins by the Catarole process. Other agreements are also being made with the Lewis Berger group and British Paints for the fullest exploitation of styrene and synthetic resins.

Zinc Vapours

New Condensation Methods

IMPROVED methods of dealing with zinc vapours are claimed in three recent patent applications filed by the New Jersey Zinc Company, U.S.A.*

Two of the applications concern specially designed splash zinc condensers incorporating suitable cooling methods and the other deals with improved condensing technique. In the usual pyro-metallurgical practice of smelting zinc ores the metal is recovered in a molten state by condensing the vapours from the gaseous products of smelting. In continuously operated smelting equipment, utilising externally or electrothermally heated retorts, zinc vapour diluted with ordinary smelting gases is passed through the condenser at a temperature of 500-550°C., and a cooler to the condenser is provided.

A special feature claimed in the improved method is the provision of a substantial volume of molten zinc in the bottom of the condenser, continuously stirred and communicating with another body of molten zinc in a discharge well outside the condenser. It has been found that the right temperature can be attained by dispersion of heat from the outside mass of molten metal, the latter being of smaller volume than that inside the condenser, and may be cooled by a suitable immersion vessel.

* Eng. Pat. Appln. 13404/1946; 13511/1946 and 2389/1947.

NCB Investigation

Sequel to Sir Chas. Reid's Resignation

THE National Coal Board has announced—concurrently with the news of the resignation of Sir Charles Reid, its production director—that a committee of investigation has been set up “to take stock of the position reached in the development of the Board's organisation, and to advise the Board whether any improvements can be made.” Chairman of the committee will be Sir Robert Burrows, recently appointed an NCB member and former president of the Lancashire and Cheshire Coal Research Association—the other members being Sir Mark Hodgson, and Sir Charles Renold, chairman of the British Institute of Management.

Sir Charles Reid, whose resignation as production director, last week was the subject of questions which served to reveal the perplexity of the Minister of Fuel, was known to have been pressing for such an investigation for some time. Sir Charles is reported as saying that he believed nationalisation of the industry was necessary to achieve full technical reconstruction. A few weeks ago (*THE CHEMICAL AGE*, April 24) he charged miners with “not playing the game,” saying that disputes were more frequent, and that production per man was not rising, despite increased mechanisation.

CANADIAN SYNTHETIC RUBBER

THE \$20 million synthetic rubber industry in Sarnia, Ontario, is stated to be unafraid of crude rubber competition. This statement is attributed to a Polymer Corporation official, who added that it was attracting \$37 million worth of new business, and he thought that an unprecedented boom would follow. Although the Crown-owned polymer plant at Sarnia stands to lose a large order from the U.S. Government, involving more than 30 million lb. of rubber a year, officials say they are unconcerned, because they claim the discovery of a new type of synthetic rubber “to beat crude rubber for automobile tyres.”

The new synthetic rubber, which is already in production in the U.S.A., is being produced in experimental quantities at the Sarnia plant. Commercial production will begin next autumn. For the last three months the U.S. Office of Rubber Reserve has been taking the Canadian plant's exportable general rubber surplus, about one-third of total production. A new colony of industrial development in Sarnia and the surrounding area will absorb enough of Polymer's by-products to make the U.S. market of minor importance.

A STATE CHEMICAL INDUSTRY

Reported Scope of Czech Production

TWO important factors influencing the chemical industry in Czechoslovakia are the nationalisation programme begun in 1945 and the Two-year Plan started the following year. State control has been considerably extended, especially since the recent political upheaval, so that now only about 8 per cent of total trade and industry is in private hands. The chemical industry is one of the most important in the country. Its principal products are heavy chemicals, mineral oils and derivatives, explosives, fertilisers, tar, rubber, asbestos, and paints and varnishes.

By presidential decree in 1945 some 94 establishments (about 12 per cent of the whole) were nationalised, and classified in ten groups. The State-controlled concerns appear to be under two central bodies: ENUC (Enterprise Nat. Usines Chim.) Czechoslovakia, in Prague, and ENUC Slovakia, in Bratislava.

One of the leading concerns is the Staline Works, which includes large mineral oil refineries at Horni-Litvinov, the centre of the Most coalfields in northern Bohemia. Future projects are expected to include the establishment or extension of the manufacture of industrial gases (oxygen, hydrogen, nitrogen), paraffins, commercial benzenes and other distillation products and mixtures, and ammonia sulphate.

Essential Supplies

An official report published in 1946 gave particulars of foreign participation, the leading holders of share capital being British, U.S., Swedish, and Dutch concerns. Some of the big refineries such as Fanto in Pardubice, Apollo in Bratislava, Dubova and VOC in Kolin and Privoz, suffered considerable war damage. Much reconstruction and extension work has been achieved during 1946-47, however, despite shortage of materials, plant, equipment, and skilled labour. Particular attention has, of course, been directed to materials fundamental to the national economy, such as sulphuric acid, alkalis, fertilisers, liquid fuels, and artificial fibres.

In the export field, emphasis has been mainly on the production of coal-tar and its derivatives, citric and formic acids, titanium white, permanganate of potash, zinc white, carbon disulphide, lithopone, and enamels. Trade is being fostered with many European countries, South America, and Australia. Total export figures for

1947 are expected to show a substantial increase over 1946, and although imports may still exceed exports it is very probable that the adverse balance, so far as chemicals are concerned, will be greatly reduced. Exports to the U.K. and the U.S.A. appear to be increasing.

Provisional 1947 production estimates for some of the principal products expressed both as tonnage and as percentages of the Two-year Plan targets, are as follows:—

	Tons	Per cent of target
Phosphatic fertilisers	343,645	90.4
Nitrogenous fertilisers	132,383	102.6
Sulphuric acid	191,880	98.9
Soda	89,487	96.1
Synthetic wool	14,494	94.3
Rayon	4,382	93.7

Slovakian Steel Plans

Plans in hand for the industrialisation of Slovakia, the easternmost province of Czechoslovakia, include the erection of a number of blast furnaces with an annual capacity of 500,000 tons of pig-iron. It is intended to build up a Slovak iron and steel industry on domestic ores—the bulk of which have an Fe content below 30 per cent—which should cover about one-half of total ore requirements, the other half being met by the import of foreign, chiefly Soviet Russian, ores. Previous investigations had shown that Slovakia had some 20 million tons of ores suitable for the planned furnaces; if the low-grade ores are included, reserves total some 300 million tons.

ERP Chemicals for Italy

Chemicals valued \$500 million will be imported into Italy in pursuance of the U.S. ERP programme. This was one of the facts brought to light at the recently concluded chemical congress held in conjunction with the international fair at Milan.

An Italian correspondent reports that very little interest in Italian chemicals is being shown by foreign visitors to the fair, but Italian firms still expect to a considerable amount of business with American buyers. On the other hand, Italian purchases of foreign chemicals are restricted by the fact that it is no longer possible to dispose of the goods available for export and therefore no dollars can be obtained.

EXPLOSION AND POISON HAZARDS

MoL Study of Causes and Safeguards

THE dangers of explosion, asphyxiation and poisoning confronting certain industrial employees, particularly in the chemical and electrical trades, together with suggested methods of minimising these risks, are dealt with at length in a recent memorandum issued by the Factory Department of the Ministry of Labour (Form 814, HMSO).

The pamphlet concentrates on the types of accident liable to occur during the cleaning, examination and repair of stills, tanks or containers which have been used for the storage or processing of benzol, acids and other chemical materials capable of giving off dangerous vapours and gases.

Classification of Gases and Vapours

Following a comprehensive survey of the possible causes of explosions, including the ignition of gases by sparks from steel or iron tools, faulty electric cables and lamps, static electricity, etc., the memorandum presents the following classification list which groups gases and vapours according to the degree of danger which they present; Group I being the least dangerous and Group IV the most dangerous—in the opinion of the testing authority, which, at the present time, is the Ministry of Fuel and Power.

Group I.—Methane (firedamp).

Group II.—Blast-furnace gas, propane, butane, pentane, hexane, heptane, octane, decane, cyclohexane, benzene, xylene, acetone, ethylene, methyl ethyl ketone, methyl acetate, ethyl acetate, propyl acetate, amyl acetate, butyl acetate, methyl alcohol, ethyl alcohol, butyl alcohol, amyl alcohol, ethyl ether.

Group III.—Coal gas (town's gas), coke-oven gas.

Group IV.—Acetylene, carbon bisulphide, hydrogen.

It is pointed out that flameproof apparatus certified for use in one of these groups should be used only in gases or vapours falling in that particular group or in a lower group. No apparatus has been certified for use in Group IV and when gases of this type may be present it is recommended that all electrical apparatus must be excluded.

The memorandum states: It is preferable to use portable handlamps, supplied either from a self-contained battery or a transformer and appropriately certified, rather than portable lamps having a trailing cable, for connection to a mains supply. If, however, the use of the mains fed type of handlamp is unavoidable, then a portable lamp of flameproof type should be used in conjunction with three-core tough-rubber-

sheathed flexible cable, preferably of the heavily insulated mining trailing cable type, in which one core forms the earthing conductor for the metalwork of the lamp.

The glass of the handlamp should be guarded by a substantial cage or guard, as there is always a risk of ignition of the inflammable vapour from the incandescent filament of the lamp should its glass bulb be broken.

The flexible cable should be connected to the electricity supply system by means of a plug and socket-outlet connector controlled by a double-pole switch. This connector, unless it is placed where there is no possibility of an inflammable atmosphere, should be of the flameproof type and should have the plug interlocked with the switch, so that the plug may be inserted into or withdrawn from the socket-outlet only when the switch is in the "off" position.

Low voltage is no safeguard against the ignition of inflammable gas or vapour by a spark, but intrinsically safe apparatus, which in general operates at low voltage, has the circuit energy limited so as to render any electric sparking which may occur in normal working incapable of causing ignition.

Special attention must be paid to the dangers arising from static sparking. The conveyance of air, dry steam, hydrocarbons, and organic liquids in general through pipelines is liable to cause accumulation of static charges. All pipe lines carrying such substances to stills, tanks and other vessels should therefore be properly bonded across all joints with adequate earth connections. As all such vessels should be earthed, pipe lines can be bonded to them.

Poison Hazards

In connection with precautions against poisoning, a danger to employees entering tanks which have contained liquids yielding harmful vapours, the pamphlet states that when sludge or scale has to be removed from the container, the simple and obvious expedients of fume removal before entry and the wearing of a life-belt may not in themselves suffice. Complete safety can only be ensured by the provision of suitable breathing apparatus in addition to a roped life-belt.

In order to maintain good ventilation in a tank during working operations, a jet of compressed air, or other efficient means of ventilation may be kept going continuously, the air being taken from a source which is free from noxious gas. If such a jet is used, the nozzle, if of metal, should be efficiently

earthed to avoid any possibility of static electrical discharge.

Where possible, storage tanks should be provided with large top and bottom openings so that cleaning may be done from outside and in order that there may be a free flow of fresh air through the tank. Such ventilation does not do away with the necessity for the aid of breathing apparatus and life-belts, if there is risk from noxious vapour. The fact that a vessel has been out of use for some time is no guarantee that it is free from noxious or explosive gas.

This aspect of plant maintenance is dealt with in British Standard No. 470 for sizes and positions of manhole openings for chemical apparatus, fixed and mobile, and also under the Factories Act, 1937, Section 27.

Nitrous Fumes

Poisoning resulting from nitrous fumes during the cleaning and repair of vitriol sludge tanks and acid chambers in sulphuric acid works, is also touched upon and the memorandum notes that these fumes can also be produced from atmospheric nitrogen when oxyacetylene flame impinges on metal. These fumes are extremely insidious when the work is done in a confined space; illnesses, terminating fatally, which have occurred a number of hours after cessation of such work, have, in several instances, been traced to this cause.

The death of a man employed in welding electrically the two halves of a galvanised hot water tank in the basement of a building is reported from America as being due to nitrous fumes.

The danger of asphyxiation due to exhaustion of atmospheric oxygen in a vessel or confined space which otherwise may contain no poisonous vapour should never be overlooked.

Many authorities are of the opinion that, when the cleaning of vessels used for carbon bisulphide and other low boiling-point and flash-point liquids is taking place, it is not safe to introduce steam into the tanks. The memorandum states that many of the leading chemical firms use the following procedure. The vessel is first nearly filled with cold water, the latter is brought to the boil by the introduction of steam, and boiling is continued for half-an-hour. The water is drained off and live steam is passed through the vessel, which is finally blown out with air.

Many recent occurrences have revealed the danger of spontaneous ignition of finely divided carbon, sulphide of iron, or other pyrophoric material deposited on the interior walls of stills and fractionating columns. Danger arises owing to the disengagement of toxic gases due to spontaneous combustion of the deposit when air is admitted.

A far more serious risk develops, however, if the deposit is burning at the time when the still is being recharged with material which gives off inflammable vapours.

If, therefore, the interior of the still or column is found, or suspected, to be dry when the vessel is opened after steaming and cooling, the interior walls should be immediately wetted with steam or water-spray and kept damp until the pyrophoric substances have been removed as far as possible.

This recommendation applies particularly to stills, columns, and reflux condensers used for benzol, tar acids and tar oil. If such a vessel has been standing idle after steaming, a further steaming should be carried out in order to moisten the interior of the plant before opening it. Immediately before putting the vessel back to work similar steps should be taken to moisten any possible pyrophoric deposits.

Acid Tanks and Wagons

To clean a tank wagon which has been used for the transport of acids, it should be filled with water and agitated with compressed air for 15 minutes to form a suspension of the sludge. The removal of the heavier portions of the sludge on the bottom should be done by a jet of high pressure water, washing it straight through. The tank should then be filled with water and the last traces of acid neutralised with soda. The tank should be inspected by a competent person and not passed forward for repair or filling before it has been certified free from dangerous gases or vapours.

To clean acid storage tanks, all pipes should be blanked off and the sludge removed as above by high pressure water directed from the top manhole, aided by compressed air. The tank should then be filled with water, neutralised and inspected in the same way. If it is necessary for any person to enter before the sludge is removed, a breathing apparatus and life-belt should be used. Rubber boots also should be worn.

A test should be applied before entry to every tank or wagon to ascertain whether hydrogen is present in explosive proportions; where a test is not practicable no tools or dip rods made of steel or iron should be used and the workers should wear rubber boots or shoes without iron nails.

Tests should be made also for sulphuretted hydrogen and arseniuretted hydrogen; these gases have caused fatal accidents in acid tanks and tank wagons.

Special tests capable of detecting dangerous concentrations of the following gases or vapours have been developed by the Department of Scientific and Industrial Research in conjunction with the Associa-

(Continued overleaf)

tion of British Chemical Manufacturers and the Factory Department*: Aniline vapour, arsine (arseniuretted hydrogen), benzene (benzol), carbon bisulphide, carbon monoxide, chlorine, hydrogen cyanide, hydrogen sulphide (sulphuretted hydrogen), nitrous fumes, organic halogen compounds, phosphene, sulphur dioxide.

The report calls attention to the requirement of the Chemical Works Regulations that before any worker not wearing breathing apparatus can enter any vessel which may have contained poisonous or corrosive material, the competent observer must give a written certificate to the effect that the vessel has been inspected and is safe to enter by an unprotected man. Such certificates should be written in ink or indelible pencil and should be in book form with provision for carbon copies to be retained in the book.

It has long been a common practice, it recalls, to use animals, such as mice and birds, to test whether the atmosphere in suspected places is safe for men to breathe. The chemical tests listed above were devised because inquiry showed that animals were not reliable as indicators for all gases.

Two gases only, carbon monoxide and hydrogen cyanide, affect mice and birds

* "Methods for the Detection of Toxic Gases in Industry" (Leaflets 1 to 12) obtainable from H.M. Stationery Office.

SPANISH CHEMICAL PROGRESS

TWO American scientists, Dr. D. F. Othmer and Dr. R. S. Aries, of the Brooklyn Polytechnic Institute, who have just returned from a tour of chemical plants in Barcelona and Bilbao, state that the rapidly increasing modernisation of the chemical industry in Spain will eventually make the country self-sufficient in certain products. Their report adds, however, that despite the development of Spanish export markets in Britain and Latin America there appears to be little likelihood of the country becoming a large-scale exporter. The two scientists found the chemical installations they visited were "of top quality" and financed in certain cases by French and British capital. Increased attention was being paid to the production of potash, tungsten and mercury.

Fatalities in Chemical Works

Fatalities in the chemical and allied industries reported in March totalled four, according to the *Ministry of Labour Gazette*. In the metal extracting and refining indus-

tries, and in metal conversion and founding (including rolling mills and tube making) there were 12 fatal accidents. There were eight cases of lead poisoning, and two of aniline poisoning were reported. Thirty-three persons contracted skin cancer during the period, and 19 cases of chrome ulceration were reported.

exactly as they affect men, but low concentrations of other gases do not necessarily produce the same symptoms as in men. If mice and birds are used as indicators, it is most important that their reactions to low concentrations are clearly recognisable and understood by those using them.

Within their limits animal tests are, in one respect, better than the usual chemical tests, because if mice or birds are kept in the suspected place while men are there, and under reasonably close observation, they serve as continuous indicators of the conditions.

Where it is unnecessary to enter vessels for cleaning purposes, it may be possible, states the report, under exceptional circumstances and where facilities are available, to ensure safety against fire and explosion risks during repair by injections of carbon dioxide or other inert gas or material such as carbon tetrachloride.

Precautions must, however, be taken to ensure that sufficient inert material is used and that it is not allowed to leak unduly while the repair operations are being carried out, and that a relief is provided to prevent bursting of the vessel due to heat expansion of the contained gas. This method is subject to many limitations and would have to be used with great caution, particularly if the inert material used gives rise to toxic fumes or vapours.

Inquest on I.C.I. Worker

At an inquest on May 7 at Huddersfield on Mr. Luke Beaumont (42), of 27a Commercial Street, Huddersfield, a former chemical process worker employed by the local Dyestuffs Division of I.C.I., Ltd., Dr. Denton Guest said that the chemicals with which the man came in contact during his employment could cause cancer of the bladder from which Mr. Beaumont died. The Coroner (Mr. S. D. Lister) recorded a verdict of death from cachexia and toxæmia from secondary malignant growths originating from cancer of the bladder. Mr. Lister added a rider that he was not prepared to state from what source the cancer originated.

RESEARCH ON PROPELLANTS

Typical Problems of Ordnance Scientists

THE nature of some of the problems which before and during the war pre-occupied Government scientists concerned with propellants, and the solutions of some of them, were described at a recent meeting of the Chemical Engineering Group of the Society of Chemical Industry. The paper, "Modern Propellants Employed in British Ordnance," presented by Dr. J. N. Pring, outlined some of the physical limitations and practical considerations which conditioned the selection of suitable chemical propellants.

Regular ballistic performance was obtained by employing nitrocellulose as a basis and converting to a non-porous gelatinised or colloidal form to moderate the rate of burning. The cord propellants used in the British Services burn at a rate given by $R = \beta p^{\alpha}$, where R is the rate of reduction of cord diameter, p the pressure, β a constant 1.07, α is about 0.5 at pressures up to 2.8 tons s.i., rising to nearly unity between 2.8 and 20 tons s.i.

The sum of the reactions consisted of the transfer of oxygen from the nitro groups to hydrogen and oxygen. The final products consisted accordingly of the simple gases CO , CO_2 , H_2 , H_2O accompanied, with cooler propellants, by CH_4 , NH_3 and free carbon.

Cause of Flash

Muzzle-flash for a 15 in. gun had been found to have a transient peak luminosity of 200 million candle power, derived from the explosion at the muzzle of CO and H_2 . Early attempts to reduce erosiveness by lowering the calorimetric values of cordite compositions, also promoted flash by lowering the degree of oxidation of the CO and H_2 . The success finally obtained with the flashless propellants consisted in devising compositions in which cooling was achieved with a decrease in CO and H_2 in the products.

Flash-inhibitors include salts of alkali metals which probably destroy the chain-carriers (H , O , OH , HO , CO) or retard chain-branching reactions. Reduction in CO and H_2 in decomposition products was achieved by blending in compounds of high-nitrogen content which were at the same time exothermic. Nitroguanidine is very suitable, having the further advantage of being synthesised and not requiring food-stuffs for its manufacture.

The nitric esters slowly decompose, yielding NO_2 , and acids with auto-catalytic effect. Unsaturated constituents of the mineral jelly in the cordite helped to arrest the

breakdown, and chalk present in the nitrocellulose neutralised acidity. Iron pyrites in the initial cotton waste proved a danger in cordites M.D. and M.C. as the sulphuric acid formed by it caused serious local decompositions.

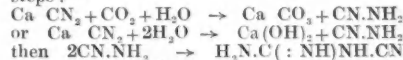
Tests for stability introduced in the 1920's included pH determinations and some very delicate calorimetry permitting measurement of heat evolution down to 0.01 cal/hr. from a charge of 18 gm. at temperatures of 32°C .

The stable composition adopted for the Navy in 1923 was the solventless propellant:

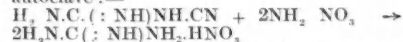
Nitrocellulose (12.2 per cent N)	49.5
Nitroglycerine	41.5
Diethyl diphenylurea	9

Many difficulties had to be overcome before the use of nitro-cellulose from wood replaced that from cotton, notably roughness in the surface of the extended cord.

The synthesis of nitroguanidine is along the following lines: Calcium carbide is converted to calcium cyanamide by the action of nitrogen at 1200°C . This is converted to dicyandiamide by the following steps:—



On fusion with ammonium nitrate solid or treatment with its aqueous solution in an autoclave:—



Treatment with concentrated sulphuric acid removes a molecule of water yielding nitroguanidine $\text{H}_2\text{N.C(:NH)NH.NO}_2$.

The total cost of nitroguanidine in Canada has been given at between 6d. and 1s. per lb.

INSTITUTE OF FUEL

MENTION is made in the 1947 report of the Institute of Fuel of the formation of a sub-committee to collaborate with a similar body set up by the Institute of Petroleum with a view to giving greater consideration to the use of oil fuel. A joint conference dealing with the modern applications of liquid fuels is to be held at Birmingham University in September.

The report reveals an increase in membership in every section and the balance sheet shows that the total net income from subscriptions and investments was £8720 against £7829, and the total net expenditure, including £2827, excess of expenditure over income on publications account, was £11,288, showing a deficiency for the year of £2558 against £2976 for the year 1946.

URANIUM PRODUCTION PROGRAMME

U.S. Commission Stimulates Private Prospecting

From Our New York Correspondent

THE U.S. Atomic Energy Commission has announced a three-point programme to stimulate the discovery and production of domestic uranium by private competitive enterprise. It is described by Mr. J. K. Gustafson, director of the AEC Division of Raw Materials, as "an opportunity for prospectors and mining companies to participate in the nation's atomic energy industry by exercise of their own initiative and with the profit incentive."

The major elements of the programme are:—

1. Government - guaranteed ten - year minimum prices for domestic refined uranium, high-grade uranium ores and mechanical concentrates.

2. A bonus of \$10,000 for the discovery and production of high-grade uranium ores from new domestic deposits.

3. Government-guaranteed three-year minimum prices for the low-grade carnotite- and roscoelite-type uranium-vanadium ores of the Colorado plateau area and Government operation of two vanadium-uranium plants in that area.

Free Enterprise

The advantages of free enterprise are emphasised thus: "The Commission recognises that, in line with the policies expressed in the Atomic Energy Act of 1946, development and production of uranium ores can be stimulated most effectively by the type of private operations responsible for the growth and efficiency of the American mining industry. The interest and energies of individual prospectors, small operators and large mining companies are now required in the production of source materials for atomic energy."

The AEC guarantees minimum prices for domestic refined uranium, high-grade uranium-bearing ores and mechanical concentrates. The guaranteed minimum prices are \$3.50 per lb. of recoverable uranium oxide from uranium-bearing ores and concentrates, less the cost of refining and \$3.50 per lb for uranium oxide.

Against the \$13.80 per ton currently being paid by private industry for carnotite- or roscoelite-type ores containing 2 per cent vanadium oxide and 0.2 per cent uranium oxide, the Commission, for a period of three years, will pay producers \$20.40 per ton for this grade of ore delivered to it at Monticello, Utah or Durango, Colorado.

The schedule provides for payment of

\$1.50 per lb. of uranium oxide for the delivery of ores assaying 0.20 per cent, plus a development allowance of 50 cents per lb. Premiums will be paid for delivery of certain higher grades of ore, however, and a lower price will be paid for delivery of ores containing less than 0.20 per cent uranium oxide with no payment for ores containing less than 0.10 per cent. Payment also will be made based on the vanadium oxide content of the ore at 31 cents per lb for an amount not exceeding 10 lb. for each lb. of uranium oxide.

It is expected that the Monticello purchase depot will be ready to receive ore during July, 1948 and that the Durango depot will be in operation shortly thereafter.

Following the announcement of the AEC's price-fixing programme, several Utah-Colorado uranium and vanadium producers, members of the recently formed Uranium-Vanadium Co-operative Association, criticised the Commission's ore-purchasing programme, declaring that "in many instances the announced ore-purchasing programme does not stimulate production of domestic uranium."

Australian Policy

A move in a similar direction has also been made by the Federal Government in Australia, according to the Australian News and Information Bureau in New York. Discovery in Australia of a deposit of ore capable of yielding 25 tons of uranium oxide will earn the finder \$3,200 and an additional allowance of up to \$80,000 according to the richness of the find, it has been announced. These rewards will be paid by the Federal Government for discoveries of uranium ore by any non-official searcher. Even a deposit, too small to be of economic importance but justifying further prospecting the neighbourhood, will qualify the finder for a reward, the amount of which will be determined by Mr. William Ashley, Supply Minister.

Restricted Italian Starch Production.

Although starch, dextrine and glucose factories in Italy suffered little damage in the war, and the addition of new plant has raised the potential output of the industry to over 120,000 tons per annum, the acute shortage of maize or rice by-products during the past two years has seriously affected the country's starch production.

DETECTION AND DETERMINATION OF TRACE ELEMENTS

Papers Submitted at Analysts' Symposium

AT a meeting of the Microchemistry Group of the Society of Public Analysts and Other Analytical Chemists, held jointly with the local sections of the three Chartered Societies, in the Chemistry Department, Marischal College, The University, Aberdeen, on May 4-5, the papers dealt mainly with the detection and determination of trace elements and of quantities much smaller than those usually found in ordinary microchemistry.

Sub-micro Methods

Dr. Cecil L. Wilson, of the Chemistry Department, Queen's University, Belfast, opened the symposium with an outline of sub-micro methods. These were first developed by biologists to meet their own special needs and have, to a limited extent, been in existence for many years. Thus, the work of Rehberg, Kirk and Wigglesworth dealt with amounts of constituents in body fluids of the order of a few micrograms, and achieved a high accuracy in these and similar volumetric determinations. Benedetti-Pichler applied a new technique of microgram methods to inorganic analysis in the late 1930's. The importance of atomic energy has focused attention on newer methods based on Benedetti-Pichler's work, since it is apparent from published data that the methods applied to the investigation of the trans-uranic elements derive largely from his pioneer work.

Work of this type, said Dr. Wilson, involves samples of the nature of a microgram or less in weight, and volumes based on the microlitre, or cubic millimetre, as the unit. Manipulations are carried out by the use of micromanipulators under a low-power microscope, and to avoid evaporation of the small amounts of solution, a moist atmosphere is maintained in a specially designed chamber. Liquids are transferred by hydraulic pressure applied from a screw plunger or a micrometer syringe, operating on micropipettes with tips having a diameter of about 30-40 microns. Centrifuge cones hold an average volume of one-tenth to one-quarter of a microlitre, and precipitates in these are centrifuged, heated or otherwise treated by specially devised but relatively simple operations.

More recently, volumetric methods using variants of the same apparatus have been investigated, and some of these show a satisfactory accuracy. Gravimetric procedures are made possible by the use of

quartz-fibre torsion balances. The most recently devised of these have overcome the usual difficulty of achieving a favourable relation between load and sensitivity, and their performance may be almost as good as that of an ordinary analytical balance in this respect.

That the methods are practicable is shown by the report that a direct scale-up by 10^{10} from the separations investigated on this scale was used successfully in designing and operating the Hanford plant.

Polarographic Determination

Mr. G. W. C. Milner, of the Bragg Laboratory, Sheffield, described trace determination by means of the polarographic method of analysis, pointing out that the apparatus, now widely known, uses the measurement of diffusion current, with variable applied potential, between mercury electrodes, for the qualitative and quantitative determination of materials and the resulting polarogram is usually recorded, either photographically or by means of a pen recorder.

Where an element is present which deposits at a lower applied potential than the element being determined, sensitivity and accuracy may fall off, but traces of elements can usually be estimated in metals which give a wave at a higher applied potential. Interferences may be overcome by a variety of methods. For example, the ferric-ferrous wave, which interferes with the determination of copper, may be removed by a preliminary reduction of the ferric iron. Other methods of dealing with interference include precipitation or complexing of the interfering elements, or their removal by electrolysis under controlled potential.

The polarograph has been applied, apart from alloy analysis, to the determination of tin in foodstuffs, and of cadmium and copper in biological materials. A special case is that of zinc, which suffers interference from nickel and cobalt, and therefore cannot be determined directly in the presence of these elements. The interfering elements may first be complexed, the zinc subsequently being concentrated by extraction, or the base electrolyte may be altered from the usual chloride base to one containing ammonium chloride, ammonia, sodium sulphite and gelatine, when a satisfactory determination proves possible.

(Continued overleaf)

For elements which do not form coloured organic complexes, the polarograph offers a solution to the analytical problems involved. But it is by no means ideal for trace analysis and, where colorimetric methods are possible, these are to be preferred, both on the grounds of accuracy, and because they do not necessitate concentration procedures.

The Microscope in Chemistry

The final paper of the symposium, also by Dr. Wilson, dealt with the microscope as a chemical tool. The speaker said that although the microscope had not yet reached the popularity in pure chemistry that its usefulness would warrant, chemical microscopy is probably the oldest branch of microchemistry.

In inorganic qualitative analysis, specific tests for both cations and anions based on the formation of characteristic crystalline forms exist, but interferences, and the general possibility of the formation of mixed crystals, must always be borne in mind. Thus, the double mercury thiocyanates, which have been extensively studied, may give misleading results if the operator is not familiar with the ranges of mixed crystals which may be formed. If he is, however, semi-quantitative as well as qualitative information may result.

In organic qualitative analysis, group tests may give distinguishable crystals with the individual members of the group, as in

the case of the osazones. On the other hand, it may be necessary to investigate the optical properties in order to distinguish between members of homologous series.

Among physicochemical determinations, melting point, using a hot stage and polarising equipment, offers a means of observing inhomogeneity, since the melting of single tiny crystals can readily be followed. Refractive indices of both liquids and solids can be determined by a variety of methods. The specific gravities of liquids and solids can also be measured with reasonable accuracy, while for the determination of molecular weight microscopically, either osmotic or vapour density methods are available.

While the microscope finds extensive application in applied fields of chemistry, such as those of textiles and metals, the methods are specialised. Its application to purely chemical problems will often offer a simple solution, and should be resorted to more frequently than at present.

Other papers were presented by Dr. T. G. Brady, Department of Biochemistry, University College, Dublin, who dealt with microdiffusion analysis, and Dr. R. L. Mitchell, Macaulay Institute, Aberdeen, who spoke on the simultaneous concentration of trace elements with organic precipitants with particular reference to rock, soil and plant constituents.

ACRYLONITRILE FROM ACETYLENE

THE Germans successfully developed the direct synthesis method for making acrylonitrile by the addition of hydrocyanic acid to acetylene, and before the war ended had started construction of large plants at Leverkusen, Ludwigshafen, and Auschwitz. Their progress has now been reviewed in a report published by the Office of Technical Services, U.S. Department of Commerce, prepared by Mr. Nill and Mr. R. Largent, of the Solvay Process Company, Syracuse, New York, following an extensive study of German practices.

The design of the proposed plants was influenced by the success of I.G. Farben research workers in purifying the acrylonitrile product, and increasing the life and efficiency of the catalyst solution.

Development of the important reaction vessel, optimum operating conditions for the reactor and the reasons for them, present treatment and proposed purification of recycled reactor gas, and the important operating details of the distillation and refining of crude acrylonitrile at the 70-ton per month Leverkusen plant, are discussed.

At the end of the war, construction of a 200-ton per month plant similar to the 7-ton plant was in progress at Leverkusen.

The investigators also discuss the proposed designs for a 600-ton plant at Ludwigshafen and a 400-ton plant at Auschwitz. These plants were never completed but from information obtained from an I.G. Farben chemist, it appeared that the plants would produce an acrylonitrile of very high purity, and that there would be a marked increase in the life of the catalyst solution and a greater output of acrylonitrile per unit of volume of catalyst solution.

Diagrams of the Leverkusen reactor, the reaction system for the 200-ton per month plant at Leverkusen, and a flow diagram showing the equipment and operating data for the 600-ton proposed plant at Ludwigshafen are included. The report, No. PB-81283, is entitled "Manufacture of Acrylonitrile by Addition of Hydrocyanic Acid to Acetylene," and is obtainable from the office of Technical Services, U.S. Department of Commerce, Washington 25, D.C., price 50 c.

RUBBER IN CHEMICAL ENGINEERING

Uses Widened by New Procedures

THE production of rubber, modern methods of processing and the various applications of the finished product in the chemical engineering field were surveyed in a lecture delivered recently by Mr. H. C. Young, engineering liaison officer, British Rubber Development Board, to members of the London section of the British Association of Chemists.

New Plantation Methods

Mr. Young described the various plantation processes by which the latex is transformed into crêpe or sheet rubber.

It had long been the dream of rubber technicians to process rubber at the plantation so that initial coagulation, sheeting, washing and smoking could be avoided and methods of centrifuging have been used in the attempt to dispense with the coagulation process.

Pelletising had also been attempted with some success and in recent years a British firm has produced fine rubber sheeting by "creaming" the rubber on to a moving steel belt and driving off the moisture. From the end of the belt a thin rubber sheet of the desired width and about 5/1000-inch thick is taken up.

The usual concentration of shipped latex is 60 per cent and it could be diluted to any desired concentration and in this state electrically deposited on prepared formers. The heavy grading screens for the coke industry are so treated.

A patented process was that of a self-vulcanising latex which does not require the aid of heat or other usual vulcanising influences. Latex could be used for such purposes as the covering of cables, by spraying or electrodeposition on to formed objects and in a variety of ways of interest to chemists and chemical engineers.

Compounding and Vulcanisation

By mechanically compounding rubber with sulphur and applying heat, the range of physical, thermal and chemical properties could be vastly improved, and the uncured rubber could be applied and vulcanised *in situ* by heated air, water or steam.

Plasticised uncured rubber could be extruded into complicated sections, or on to wires and rods. It could also be calendered on multi-roll machines to any desired thickness and up to 7 ft. in width. Calendering, which produced sheet only 3.4/1000 in. thick, could also be used to force a rubber compound into a fabric sheet. From the calendered sheet or extruded section the

material could be hand-built into any required shape or construction.

Thinly coated articles are vapour or liquor cured by passing them through a sulphurous vapour chamber or by passing them over wetted rollers which act in the same way as the inker rollers of a printing machine. The liquor used is sulphur chloride.

Mr. Young mentioned recent developments in rubber-to-metal bonding processes, which by the electro-deposition of brass upon the metal surface and the simultaneous moulding and vulcanisation of the rubber on to the article renders possible the bonding of rubber to materials such as aluminium and steel alloys, without cement and adhesives.

Uses in the Chemical Industry

The speaker, describing the uses of rubber in the chemical industry as protective rather than structural, said that rubber could be compounded to resist most chemicals up to a temperature of 150°F. and some firms will guarantee resistance to chemical action at temperatures up to 230°F.

It was possible to line tanks with rubber both in the factory or in the rubber works. When designing tank, or piping and trunking construction, it was preferable that the purchaser discussed his problems with the rubber engineer as small alterations not affecting the main structure are often possible, giving great convenience to the rubber manufacturer without creating any disadvantage to the user.

Recently experiments had been made in producing standard metal sheets coated on one or both sides with rubber, which would enable users to fabricate their own equipment. Such a material could become a standard stores equipment, just as on some chemical plants mixed or uncured rubber sheets are kept in stock for pipe lining.

TIDU'S Service to Industry

The Board of Trade reminds industry that the Technical Information and Documents Unit (TIDU) at 40 Cadogan Square, S.W.1, maintains a large library of original German documents, treatise and research reports. These documents (as distinct from CIOS, BIOS and FIAT reports obtainable from HMSO) are available for consultation at TIDU and facilities are provided for having copies made in microfilm, microfilm print or photostat form at the cost of reproduction.

Chlorinated Rubber

BIOS Report No. 1626 Reviewed

I.G. Farbenindustrie manufactured chlorinated compounds based on natural as well as synthetic rubbers; the former was known as "Pergut," and the latter (based on Buna S) "Bunalit." The New York-Hamburger Gummiwaren Cie. also produced chlorinated natural rubber sold under the name of "Tornesit."

It appears the Germans had no novel ideas regarding the uses of chlorinated rubber, the chief application for Pergut and Tornesit being in the compounding of paints and lacquers. These compounds have good weathering characteristics, and are well known here for the protection they give against the corrosive effect of seawater. Many formulae for protective coatings are included in the text.

Production of Tornesit

The process is based on low rubber resin content crepe which is first masticated on water-cooled rolls until a 7 per cent solution of the rubber in carbon tetrachloride shows a viscosity of 200 seconds Cochius, at which stage there is still some nerve left in the masticated crepe. In solution with carbon tetrachloride, the rubber is chlorinated in an enamelled vessel fitted with a stirrer rotating at 40 r.p.m., the solution being maintained at its boiling point. This process is usually completed in 4-6 hours, the rate of absorption of the chlorine decreasing rapidly with increase of time. Chlorination continues without interruption until completed, as any break in the process would tend to cause the partially chlorinated product to gel. The viscosity of the product will also be affected if air is present in the chlorine used for chlorination. As a check on the degree of chlorination, it is stated that fully chlorinated rubber is not appreciably discoloured when heated for five minutes on a water-bath, in contact with concentrated sulphuric acid.

When the process is complete the rubber is separated from carbon tetrachloride by evaporating the solvent at 130°C. in a steam-heated drum drier, and the product stabilised by gaseous ammonia or alcoholic potash.

Production of Pergut

Pergut production was achieved by a process of a similar nature, the main differences being that the basic material is either pale crepe or smoked sheet, and that copper oleate is used as a catalyst in the chlorination process. The report is issued with the usual reservations affecting the possible infringement of existing patent rights.

Technology of GR-S

Improved Drying Time

DEVELOPMENTS in the U.S. synthetic rubber industry have been discussed by Mr. C. R. Johnson and Mr. W. Otto, of the Firestone Tyre & Rubber Co., at a recent regional meeting of the American Institute of Chemical Engineers, Cleveland, Ohio. Following the establishment in 1943 of the first four GR-S plants, providing a total capacity of 40,000 long tons of rubber, by the end of 1944 the industry had produced 949,305 long tons of synthetic rubber.

One of the problems confronting the chemical engineer in the synthetic rubber programme was the recovery of the unreacted raw materials used in making GR-S rubber. The efficient recovery of the butadiene and styrene has resulted in lower manufacturing costs and a better product.

Another problem had been the drying of GR-S. According to Mr. W. F. Bixby, of the B. F. Goodrich Chemical Co., this had been overcome by a process which speeded up the drying time from 11 days to 12 minutes, by the control of latex coagulation with table salt and dilute sulphuric acid. The coagulation of the latex was controlled to give small crumbs which could easily be washed, dried in a short time, and rolled into slabs for easy handling and storage.

An interesting development discussed by Mr. D. H. Francis and Mr. H. R. Sontag, of the Goodyear Synthetic Rubber Corporation, was the continuous reaction of butadiene and styrene, replacing the time consuming batch polymerisation used in the past. The continuous process has resulted in increasing the efficiency of the process and causing greater savings in time and materials.

H₂SO₄ in the Soviet Zone

Authorities in the Russian zone of Germany are reported to have planned to maintain sulphuric acid production at the same level as in 1947. Production for the first quarter of this year was scheduled at 32,600 metric tons (31,432 tons in the third quarter, and 28,500 in the last quarter of 1947). Of the total output, 16,200 tons will be allocated to manufacturers of superphosphates, 3000 tons to other chemicals establishments, 4000 tons to manufacturers of synthetic fibres and 1400 tons to other German users. Soviet companies operating in the zone are to receive 8000 tons.

GERMANY'S SYNTHETIC OILS

Wartime Procedure Summarised

INVESTIGATIONS of Germany's wartime science and technology, on which were based the Allied BIOS and other reports, came to an end almost exactly one year ago and have yielded some 2720 critical evaluations by experts of scientific and industrial processes. Now, fulfilling an undertaking made at the beginning of this year by the Board of Trade, overall summaries collating all the significant information relating to specific industries are being issued, of which the first is the recently published BIOS Overall Report No. 1 on the Petroleum and Synthetic Oil Industry of Germany (HMSO, 10s.).

From Many Sources

This is based on nearly 160 BIOS, CIOS and FIAT investigation reports and selection was in the hands of an organising committee, under the chairmanship of Major K. Gordon, of I.C.I., Ltd., and comprising representatives of leading oil companies in this country, and of the Ministries closely concerned.

The report contains seven sections on: (1) Coal carbonisation and gasification, (2) hydrogenation processes, (3) Fischer-Tropsch process, (4) crude oil production, (5) petroleum refining, (6) lubricating oil production, and (7) testing and evaluation of products. Two-thirds of the report's 124 fcp. pages are devoted to the first two sections.

At its peak period in April, 1944, German oil production reached the rate of 14 million tons annually, of which German and Austrian crude accounted for 2, oil from Rumania and controlled territory 7, and various coal processes 5 million tons. Some details of the synthetic oil, including German and Austrian natural refined, and excluding 380,000 tons benzol, are tabulated at the foot of this page (in 1000 tons).

Based on Coal

Coal carbonisation and gasification on a huge scale was the essential basis of synthetic oil production, and provided both the relatively pure hydrogen (96 per cent and upwards) required for hydrogenation

and the H_2/CO 2:1 synthesis gas mixture needed for the Fischer-Tropsch process. Section 1, with numerous diagrams and tables, details the various methods used such as the Winkler generator for direct gasification of brown coal (lignite), the Pintsch-Hillebrand, Wintershall-Schmalfeldt, and the Koppers processes, the Lurgi-Spülgas and the Krupp-Lurgi low temperature plant, and the three principal methods for treatment of hydrocarbon gas, namely, the methane-steam, KW, and Koppers.

Although the conventional water gas process was limited to the extent that suitable coking coal was available, it had to be supplemented very largely by the other methods in which inferior coal cokes, brown coal cokes and brown coal itself could be used. Operating data and costs are given.

Some notes, too, are included on the Linde-Fränkl oxygen units, the Alkaid method for purifying water gas, various methods of producing hydrogen by the CO conversion reaction (Wesseling, etc.), and miscellaneous processes of general interest to the gas industry, such as the Lurgi generator.

Hydrogenation

As will be seen from the above table, practically all the aviation fuel was produced by hydrogenation, of which the principal plants and their outputs at various periods are listed. During the war the urgent need for maximum quantities of high-grade aviation fuels led to erection of plant for hydro-forming both synthetic and natural petroleum products and for synthesis of branched paraffin aviation fuel components such as isooctane and alkylate.

These three groups of processes and especially the first (destructive hydrogenation) are described in detail with numerous illustrations and charts. Composition of the numerous catalysts is shown in a table (49, p. 82).

The view appears to have been strongly held in Germany that the Fischer-Tropsch process was of special value for production of aliphatic chemicals and, in particular, products such as waxes and lubricants rather

(Continued overleaf)

	Hydrogena- tion	Fischer- Tropsch	Refined Home Crude	Coal and Tar Dist'n.	Total
Aviation fuel ...	1900	—	—	—	1900
Motor spirit ...	350	270	160	35	815
Diesel oil ...	680	135	670	110	1595
Fuel oil ...	240	—	120	750	1110
Lubricating oil ...	40	20	780	—	840
Miscellaneous ...	40	160	40	50	290
	3250	585	1770	945	6550

than for fuels. Much of the work on new processes, and catalysts in this field had reached pilot plant stage and in some cases had nearly attained full industrial scale when the war ended.

The report includes a special account of the pilot plants, dealing more particularly with olefin synthesis with cobalt catalyst, regeneration of catalyst, use of iron catalyst in various ways, and production of secondary products as in the OXO synthesis. In this section, as also under hydrogenation, special attention is given to the matter of costs and their translation into English terms.

Little Home Production

During most of the war period, Germany relied on imports of petroleum products from Eastern Europe. Production in Germany itself, of which some account of methods is given, was small and for a time—in expectation of a short war—somewhat wasteful and shortsighted. Thus production was stepped up to about 100,000 tons per month, but

this had to be reduced to a uniform level of about 60,000 tons.

Special Studies

No evidence was found of anything specially interesting in petroleum refining methods, which were used mainly for the production of lubricating oils, in approximately 50 per cent yields. Of the total lubricants produced (698,000 tons, in 1942), 630,000 tons was from conventional refining, and the small balance was from sundry synthetic methods. It is pointed out that some of these methods are of considerable interest, and worthy of examination.

It is further shown that in testing and evaluating of products, the methods used by the Germans for improving their fuels and lubricants were the subject of a special study. As only a brief summary of the work can be given in the present report, and as some of the translating and correlating of reports is not yet completed, a fuller account will be given later.

MORE FERTILISERS ALLOCATED TO GERMANY

FERTILISER imports worth \$44.877 million, says Mr. D. W. Jackson, Canadian Government economic representative, writing from Frankfurt, for the Canadian Government journal *Foreign Trade*, will have been brought into the bizonal area of Germany during the twelve months ending June 30, 1948, in order to stimulate maximum indigenous crop production. Payment will be made from U.S./U.K. appropriated funds. Fertiliser imports in the six-month period July 1 to December 31, 1947, were valued at \$21.872 million, and included 221,000 metric tons of raw phosphates, 122,000 of nitrogen fertilisers and 203,000 of superphosphates and basic slag.

From Many Sources

During the current six-month period \$1.33 million more will be spent on imported fertilisers than in the previous period, supplies to a value of \$23.005 million having been purchased under contract for delivery between January 1 and June 30, 1948. Deliveries will include 247,000 metric tons of raw phosphates, 117,700 metric tons of nitrogen fertilisers and 228,000 metric tons of superphosphates and basic slag. The raw phosphates are being obtained from French North Africa, and the superphosphates from Belgium and Luxembourg. The principal source of nitrogen has been the U.S.A., while small additional shipments come from Great Britain and Austria.

Indigenous fertiliser production in the bi-

zone for the six-month period July 1 to December 31, 1947, amounted to 215,000 metric tons of nitrogen and 342,000 metric tons of superphosphates. There was no indigenous production of raw phosphates, since no suitable phosphate rock deposits existed in Germany. All imported raw phosphates were used in the manufacture of superphosphates. Bizonal potash requirements, however, says Mr. Jackson, were met entirely from indigenous production.

NEWFOUNDLAND'S RISING EXPORT TRADE

THE value of minerals exported from Newfoundland in 1947 is estimated at £3.975 million, thus creating a record and exceeding the 1946 figure by more than £1 million. Increases occurred in exports of iron ore, limestone, and fluorspar but decreases in zinc, lead and copper concentrates were recorded.

Exports of iron ore totalled 1,327,000 long tons in 1947, as compared with 1,235,179 tons in 1946. Lead concentrates declined from 39,727 tons in 1946 to 35,000 tons in 1947; zinc concentrates from 87,673 tons to 70,000 tons; and copper concentrates 19,153 tons to 16,000 tons. Limestone exports increased from 266,153 tons in 1946 to 285,000 tons in 1947 and fluorspar also rose from 26,478 tons to 41,700 tons in the same two years.

ARGENTINE CHEMICAL MARKET

Effects of Increasing Home Production

AFTER heading the list of Argentina's chief suppliers of aniline dyestuffs in 1943, Britain to-day has dropped far behind and her place has been taken by Switzerland, whose share of the market now amounts to about 40 per cent. The U.K. contribution at the present time is in the region of 20 per cent, although Argentine trade circles assert that this figure could still be substantially increased. A good market exists if Britain could increase her production capacity.

This information, together with many other facts and figures relating to economic and commercial conditions in Argentina, is contained in the recently published first volume of a new series of trade reports entitled "Overseas Economic Surveys," produced on behalf of the Export Promotion Department of the BoT.

Home Production of Chemicals

In the section of the document devoted to Argentina's imports of chemicals and colours, it is pointed out that the shortage of imported industrial chemicals during the war has undoubtedly accelerated the tendency to manufacture such products locally whenever possible, and the production of tartaric acid, cream of tartar, anhydrous ammonia, trichlorethylene, perchlorethylene aluminium sulphate, hydrogen peroxide, and lithopone is now sufficiently large to dispense with imports.

In addition, the following products are now being made locally on a considerable scale: butyl and ethyl acetate, acetic, citric and tartaric acid, butyl, ethyl and methyl alcohol, calcium carbide, gold and silver cyanide, sulphur black, pyrethrum extract, some ferrites, sodium silicate, zinc oxide, superphosphate, mineral acids, caustic soda, chlorine and derivatives.

Caustic Soda Imports

Dealing with the imports of caustic soda, soda ash and bicarbonate of soda, the report states that Argentina's large demands for these products cannot be satisfied by home producers and purchases from abroad will necessarily remain at a high level, although a substantial rise in the country's caustic soda output since the end of 1946 has strengthened the belief that within two or three years Argentina will be self-sufficient in this basic chemical. The U.K. still supplies more than two-thirds of the total amount of imported caustic soda, with the U.S.A. a close competitor and Czechoslovakia, France and Yugoslavia rapidly consolidating their post-war successes in this field.

As far as steel is concerned, the present acute world shortage brought about by the war has led the Argentine authorities to the conclusion that the only solution is the establishment of a national iron and steel industry. The Department of Military Factories began two years ago to operate a blast furnace at Zapla and present output is estimated at 18,000 tons of pig iron per annum. The supply of charcoal is a limiting factor, but it is proposed to increase supplies by planting of eucalyptus trees and kilning the timber. In addition, a site has been chosen at San Nicholas on the Parana River for the establishment of a large steel works with an anticipated annual production of 400,000 metric tons.

The progress made during the war in the manufacture of black mild steel has been maintained and all important mills, including two that started since the war, are flourishing. Output totalled 140,000 tons in each of the years 1945 and 1946, a decline of only 10,000 tons compared with 1944.

Other Products

Argentina's cement production which just exceeds one million tons per annum from the 27 cement plants now installed in the country is at present facing difficulties due to the limited transport and general distribution facilities.

A commodity which the U.K. still supplies in considerable quantities is cresylic acid used in the manufacture of sheep dips and insecticides. Gammexane, a useful product in dealing with the locust menace, is still imported from Britain, although Holland is entering this field as a virile competitor.

The report reveals that the Argentine plastics industry is developing steadily; moulding powders are much in demand. Both thermoplastic and thermosetting moulding powders are imported, the only local manufacture being of small quantities of thermosetting moulding powder of the bakelite type. Imports came chiefly from the U.S.A., the U.K., France, Italy and Canada. The market for finished plastic goods remains good.

Home production of laboratory equipment, scientific instruments and apparatus is steadily increasing, although large quantities are still being purchased abroad. Before the war, Germany commanded Argentina's import market in this connection; since Germany's eclipse 75 per cent of the business has been captured by the U.S., with Switzerland and Britain as next principal suppliers.

American Chemical Notebook

From Our New York Correspondent

NOT even for the purpose of the European recovery programme requirements can U.S. exports of nitrogen be raised above the current annual export of 61,000 tons. This was announced last week by the Assistant Secretary of the U.S. Department of Agriculture, Mr. W. A. Minor, addressing a group of Southern Congressmen. Mr. Minor said that total exports to Marshall Plan countries will not go above their current 26,000 tons, and in two years the U.S.A. will export even less. William T. Hart, export programme director, said that only 500 tons of nitrogen solids, excluding ammonium nitrate and sulphate, will be exported this year, although greater shipments are specified.

* * *

Vibration-proof and designed to control temperatures to within one-hundredth of a degree, an underground optical laboratory now being built at Rochester, New York, by Bausch & Lomb Optical Co., is thought to be unique. It is being built on solid rock, nearly 11 ft. below ground level, and will house engines used to rule diffraction gratings. Side walls, made of layers of four-inch brick, waterproofing, insulating material and 14-in. steel reinforced concrete, will be 21 in. thick. The floor will be 13 in. thick and have a special vibration-absorbing covering and the roof, 18 in. thick, will provide insulation. The extreme precision required in ruling diffraction gratings with diamond tools explains the unusual construction specifications. Gratings, used in spectrographs in place of the usual quartz or glass prisms, are small optical surfaces ruled with 15,000 or more straight parallel lines per inch. Air conditioning equipment will maintain a temperature within the laboratory constant to within 1°F. , and in the inner rooms, to within $.01^{\circ}\text{F.}$ while the engines are actually ruling gratings.

* * *

The (U.S.) General Electric Company has formed a nucleonics department which will be responsible for operation of the Hanford Works atomic energy plant at Richland, Washington, for the Atomic Energy Commission. At the request of the Atomic Energy Commission, the University of California has agreed to operate the atomic development facilities at Los Alamos, New Mexico, for another four years. These laboratories, where the atomic bomb was designed and made, were established by the university in the beginning of 1943, and have operated since then on a year-to-year basis as the Los Alamos Scientific Laboratories of

the University of California. The Atomic Energy Commission has announced that a cyclotron 20 times as powerful as any in existence will be constructed at the University of California. The super-cyclotron will probe the secrets of matter by accelerating particles with energies ranging up to 10 thousand million electron volts. The world's largest cyclotron now in operation generates only 350 million electron volts.

* * *

Using a secret process for smelting low-grade tin ore, which has been developed privately during the past ten years, the Vulcan Ditting Company has announced that it will erect at Sewaren, N.J., the only privately-owned tin smelter in the United States. It will cost approximately \$400,000. The new process will use low-grade Bolivian concentrates hitherto considered unsuitable for commercial operations. Initial output later this year is expected to average about five tons a day. Technical details of the new process are still secret. At present Vulcan is producing about 3000 tons of tin a year, principally from tin-plate clippings; if the first unit using the new process proves successful the company plans to undertake further expansion. Tin produced at the new plant will be distributed through the recognised Government channels, the Office of Materials Distribution which at present controls allocations of tin metal. In its current export bulletin, issued last week, the Office of International Trade announced that the third quarter export quota of tinplate will be 120,000 short tons. The Office of Materials Distribution has just announced that U.S. imports of tin in 1947 amounted to 64,192 long tons and, combined with supplies from secondary sources, brought the total new supply to 90,674 tons. Domestic consumption of 87,598 tons reflected "notable increases" for tinplate and solder.

Canadian Chemical Exports

Exports of chemicals and allied products in January, 1948, were valued at \$7.3 million, of iron and iron products \$19.1 million, of non-ferrous metals and products \$31.4 million, and of non-metallic minerals and products \$6.2 million. The respective figures for the corresponding period of 1947 were \$6.7 million, \$21.4 million, \$22.5 million, and \$5.5 million, and for 1938 \$1.4 million, \$5.6 million, \$14.6 million, and \$1.7 million.

Parliamentary Topics

Industrial Injuries Bill.—The National Insurance (Industrial Injuries) Bill was read for a second time.

PVC Sheeting Prices.—The increase from 7s. 4d. to 7s. 10½d. per square yard in the retailer's overriding maximum prices for PVC sheeting which is neither printed nor processed and which weighs not more than 12 oz. a square yard is wholly due to the increase in the rate of Purchase Tax to 66½ per cent.—Mr. A. G. Bottomley.

Pluto Pipeline Salvage.—Salvage of the Pluto pipelines is expected to be completed by the end of this year. By the end of March about 225 miles had been recovered at a cost of about £315,000. The salvaged pipeline contained lead and steel of an estimated value of £400,000; about three-quarters of it had been sold at that date for £299,000.—Mr G. R. Strauss.

Streptomycin Manufacture.—Production of streptomycin in this country is being developed by three manufacturers, and delivery on contracts placed by my Department has begun. For the present we are mainly dependent on supplies from the U.S.A. About 15 kg. are now being distributed monthly to certain large hospitals [where research is being done in streptomycin treatment of appropriate types of tuberculosis].—Mr. A. Bevan.

Groundnuts Scheme.—Asked for a report on the progress of the West African groundnut scheme, Mr. Rees-Williams said an expert visited West Africa last year to study ways of improving the quality of groundnuts by preventing deterioration in store. He had now returned to Nigeria with a team of chemists to carry out large scale experiments. The sale of groundnuts would be put into the hands of local marketing boards as soon as possible. A representative of the West African Produce Control Board was now in West Africa advising on the technical problems involved.

Sodium Selenate Insecticide.—Mr. Janner asked the Minister of Agriculture whether he was aware that sodium selenate insecticide, used by horticulturists was dangerous to humans, and led to sterility; and whether he proposed to take any steps to control its use. In his reply, Mr. G. Brown said he was aware of the toxic properties of sodium selenate. So far as he knew, the horticultural use of the chemical in this country had been confined to experimental work, but he was making further inquiries and was consulting the other Government Departments concerned as to what steps were necessary to control its use.

River Boards Bill.—The River Boards Bill, as amended in the Standing Committee, was considered and read a third time and passed.

German Scrap Metal.—During the first four months of this year, imports of German iron and steel scrap metal into this country amounted to about 167,000 tons.

Gas Turbines for U.S.S.R.—Mr. Harold Wilson, President of the Board of Trade, in reply to a question by Mr. P. Thorneycroft, said that 55 gas turbine engines of types not on the secret list, and available for export generally, had been shipped to the U.S.S.R. in fulfilment of contracts.

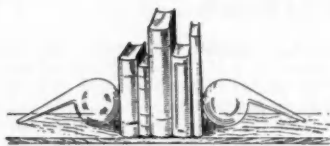
Aluminium Price.—Asked why the Minister of Supply had taken so long to negotiate a contract for the 1948 production of aluminium with the British Aluminium Co., Major J. Freeman said it took two to make an agreement. So far, the Ministry and the company had not been able to negotiate an agreed price. Another meeting would take place shortly.

Pyrethrum Flowers.—Asked whether he would postpone the proposed destruction of stocks of deteriorated East African pyrethrum flowers until the possibility of utilising them through a new process was fully investigated, Mr. A. G. Bottomley said: "The destruction of surplus pyrethrum flowers was agreed with representatives of the East African Government and growers. The East African High Commission has been asked to report regarding the new process for treating pyrethrum flowers and as to the desirability of suspending further destruction pending the result of their investigations."

Textile Institute's Progress

Membership of the Textile Institute increased during 1947 by over 20 per cent to 3728, which is more than twice the total five years ago. Commenting upon this expansion the Institute's annual report states: "There is every prospect that from the present state of flux there is emerging, in the shape of the Institute, an organisation capable of ensuring the general recognition and application of technical skill and scientific knowledge within the textile industry on a scale adequate to enable the industry to maintain its place in the increasingly complex economy of a rapidly developing world."

During 1947 new branches of the Lancashire section were formed at Oldham and Burnley and more than a hundred meetings were held by sections and branches.



A CHEMIST'S BOOKSHELF

Uniform Cost Accounting for the Fertiliser Industry.—The Fertiliser Manufacturers' Association, Ltd., London, Pp. 123+33 appendices and index. 15s.

This book has resulted from the work of a committee which the council of the FMA set up in 1946 "to consider and make recommendations on standard and uniform cost accounting for the industry."

In a short foreword the 1946 president of the association, Mr D. J. Bird (Fisons, Ltd.), warns the industry that it has been operating under artificial conditions since 1939. Sooner or later, says Mr Bird, these conditions will disappear. The industry will then have to face real, instead of subsidised prices. Supply may then exceed demand, and the latter will be seasonal.

Having regard to the diversity of size and character of many businesses in the fertiliser industry, the committee's terms of reference appear at first sight to have presented a monumental task. But the apparent difficulty has been overcome by stating principles involved, and by recommending uniformity of approach and general method.

The products chiefly discussed are compound fertilisers, superphosphate and sulphuric acid, although materials used in their manufacture also receive attention.

In the course of 19 chapters, the book sets forth practical information on such subjects as the purposes of costing, financial accounts, terminology, classification of processes, stock records, stores, wages, overheads, sales, and general matters relating to subsidiary companies, transport, by-products, and Government rebates. Section B (last four chapters) deals with supplementary considerations such as output, capacity, efficiency indices, and idle time (plant and labour).

Tables of Properties of Gases. By E. W. Geyer and E. A. Bruges. London: Longmans, Green & Co. 1948. Pp. 102. Price 12s. 6d.

The authors, both lecturers in the theory and practice of heat engines, University of Glasgow, present in this book the recent important work of various physicists on the thermodynamic properties of gases with dissociation theory and its applications. The first part of the work deals with an exposi-

tion of the principles on which the numerous tables and diagrams are based, concerning molal magnitudes, entropy, total heat, internal energy, lower heats of reaction, maximum work of reaction and equilibrium constant, and free energy. A comprehensive description of the Van't Hoff equilibrium box is given and worked examples, including problems in dissociation, are provided as well as diagrams prepared by the authors, which will assist a practical application of the tables. Bibliographical references to the text complete an outstanding treatise on this special subject, which will greatly supplement the existing literature.

The Journal of the Imperial College Chemical Engineering Society, Vol. III. Editor, D. I. W. Atkinson. London 1948. Pp. 99. 5s. 6d. net.

This slim volume of well chosen studies of contemporary aspects of chemical engineering helps to serve a field which is as yet not overburdened with authoritative literature. The cordiality with which it will be received will be the warmer on that account, and the excellent impression created by its two predecessors will further recommend it. Chemical engineering, as the editor observes, "is still hardly acknowledged by a number of British industrial organisations," and the relative dearth of literature does not help to remedy the omission. Vol. III covers wide ground in comparatively small space, giving insight into some general principles of wide application and providing close studies of specialised subjects. Belonging to the first category are "Fluid Flow Through Stable Particulate Systems" (H. Heywood), "Evaporation from Free Surfaces" (K. R. Chakravorty), "Mixing of Liquids by Injector Action" (E. T. Moss), "Automatic Process Control" (L. S. Yoxall) and "Works Management" (J. H. Chayen). More specialised contributions relate to the plastics industry (H. R. C. Pratt), the arrangement of power services (H. Bannister) and the role of the chemical engineer in cement production (B. R. Hattiangadi). The subjects are liberally illustrated with graphs, flowsheets and pictures which, with a lucid presentation, make the whole a most useful text book for rapid assimilation.

PERSONAL

SIR JACK DRUMMOND has been appointed to the board of Boots Pure Drug Co., Ltd., in succession to Mr. E. L. B. THOMAS, who has retired. In May, 1945, Sir Jack Drummond became director in charge of the company's scientific research.

SIR FREDERICK GOWLAND HOPKINS, to whom much of the existing knowledge of vitamins is due, left £14,021. Among his bequests was £50 to Mr. EDWARD J. MORGAN, for many years his laboratory assistant.

SIR ALEXANDER FLEMING and SIR HOWARD FLOREY have received the U.S. Medal for Merit for discovery and research and development work on penicillin. The awards were made on May 18 by Mr. Lewis Douglas, the U.S. Ambassador in London.

MR. R. J. TURNER has been appointed general manager for industrial sales of C. C. Wakefield & Co., Ltd. He has been with the company since 1915 and is a member of the Oil Distributors' Emergency Council and a vice-president of the Institute of Export. MR. J. A. V. WATSON has been appointed general manager responsible for Control sales, and MR. A. A. BARR as publicity manager.

SIR GRAHAM CUNNINGHAM, chairman and managing director of the Triplex Safety Glass Co., Ltd., of which Quickfit & Quartz, Ltd., the chemical glassware manufacturers, is a subsidiary, leaves on a month's visit to the United States on May 22 to re-establish pre-war contacts and study American production methods. He will be accompanied by Mr. Arthur Cochrane, assistant managing director of Triplex, and they will investigate the American production of scientific glassware apparatus and large-scale glass chemical plant, as well as raw and safety-glass production technique and the manipulation and design of plastics.

MR. A. T. S. ZEALLEY, chairman of I.C.I., Ltd., Billingham Division, and chairman of the Tees-side Industrial Development Board, has been appointed to one of the new directorships on the reconstituted board of the North-Eastern Trading Estates, Ltd. Mr. Zealley has been associated with development of Tees-side industry for several years and is a member of several organisations including the Tees-side Chamber of Commerce. He was one of those responsible for the inception of the Development Board which has influenced the establishment of three new trading estates on Tees-side.

MR. ARTHUR LEWIS has been appointed financial director of Lever Bros. (Port Sunlight), Ltd., in succession to Mr. H. B. ODLING, who is leaving Port Sunlight at the end of next month to become assistant chief accountant of Lever Brothers & Unilever, Ltd.



Dr. D. McNeil, director of research of the newly instituted Coal Tar Research Association

SIR CHARLES REID, production director of the National Coal Board, has resigned, stating that his resignation was due to lack of confidence in the Board itself and the organisation it had set up. Sir Charles' successor on the Board—though not as production director—will be SIR GEOFFREY VICKERS.

MR. G. H. TOMLINSON has been awarded the 1948 gold medal by the Society of the Chemical Industry (Canadian Section) for outstanding contributions to the chemical industry in Canada. He is vice-president and director of Howard Smith Paper Mills, Ltd., and managing director of Howard Smith Chemicals, Ltd., and is the inventor of several commercially important processes and the author of many technical papers re pulp and the utilisation of pulp mill waste liquors.

Obituary

The death is announced of MR. WILLIAM MARTIN, formerly of William Martin, Sons & Company, Bundyvan Ironworks, Coatbridge.

Chemical Developments in South Africa

Fertilisers, Insecticides and Plastics

SIR ERNEST OPPENHEIMER, who presided at the annual meeting in Johannesburg of African Explosives and Chemical Industries recently, recalled that the interests of Lewis Berger & Sons (South Africa), Ltd., and A.E. & C.I. (Paints), Ltd., were being co-ordinated by an exchange of shares and said that the latter company was erecting a £300,000 paint factory at Somerset West, which should be in full production within six months. He added that African Explosives had decided to build a nitrogenous fertiliser plant at an estimated cost of £2 million, capable of producing 26,000 short tons of ammonia a year. It was also hoped to begin the manufacture of aluminium and copper detonator tubes at Modderfontein before the end of the year. With representatives of I.C.I., Ltd., the company had been studying the possibilities of manufacturing plastics in South Africa. Other possibilities were the manufacture of aluminium sulphate and a new insecticide.

* * *

For many years South-West Africa has wasted the important milk by-product, casein. Few farmers bothered about the separated milk, though some tried feeding it to pigs. Efforts have therefore been made to induce farmers to produce casein. It is estimated that 1000 tons were exported during 1947, resulting in a return of approximately £50,000. Prices fluctuated at first, but have now found an average level of 7d. to 8d. per lb. for first-grade casein. At the factory established at Okahandja by New Clifton Manufacturers, casein is screened to 90, 60, and 30 mesh and exported to the Union for industrial purposes. Depots are being established at Otjiwarongo and Gobabis, and it is the intention of the company to collect the wet casein from farmers and to dry and wash the wet curd itself. Extensive use will be made of refrigerators.

* * *

At the Towmomba Government Agricultural Research Station, Warmbaths, Transvaal, the dwarf castor oil plant, from which an unbreakable plastic has been made, is being grown for the first time in the Union. The plant is a native of Hungary and preliminary experiments indicate that it will flourish in all parts of the Union, including areas hitherto regarded as unproductive. Edible and industrial oils could be expressed from the seed and the residue used for making plastics. If the poisonous

element can be eliminated, oilcake for cattle feed could also be made.

* * *

If heavy, unseasonable rains continue to fall in the Union's salt-producing areas, the country may again be faced with a shortage. South Africa's chief salt pans are at Hagenspan, in the Herbert District of the Cape, and at Darling and Paternoster, near Saldanha Bay. All lie in saucer-shaped depressions with natural catchment areas near, and no geographical protection. All have experienced a setback from heavy and unseasonable rains. When salt was in short supply during the war, some was imported from Arabia, but the main relief was by the importation of rock salt from the South-West African coast. Such a contingency would only arise again if production at the inland salt pans were brought to a standstill and the pans at the coast were unable to meet the heavy demands for industrial and domestic uses.

* * *

New factories now being established throughout South Africa will help considerably to ease the present serious scarcity of cement, and within the next 18 months it should be possible for manufacturers to meet the demand. Since the war the industry has been unable to supply the requirements of the housing boom and, since the lifting of building control up to 2000 sq. ft., a voluntary allocation scheme has been necessary to ensure that all builders receive a reasonable share. The recent heavy rains have held up production at several cement plants, and inadequate railway facilities have added to supply problems.

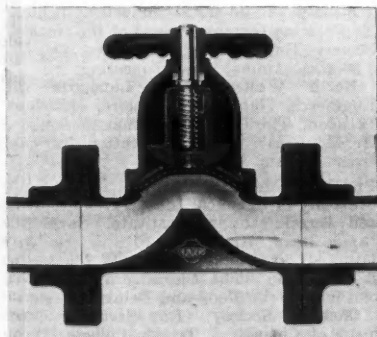
* * *

A new form of seawater soap, which he claims will cut by half the fresh-water problems of shipping, has been invented by a Port Elizabeth manufacturing chemist. After 13 months of research, he gave a demonstration recently aboard some ships in Algoa Bay. The soap contains no harmful ingredients and no caustic soda. It can be used for washing and for cleaning clothing, and metal and wooden surfaces. Orthodox raw materials for soap manufacture in the Union are still controlled and any change in the production quotas can only come about by amendment to existing Government regulations, of which there is no prospect at the moment.

Technical Publications

THE first "Statistical Summary of the Mineral Industry of the British Empire and Foreign Countries" to be issued since 1939 (HMSO, £1 1s. net) gives figures for each of the years 1938 to 1944. It will be recalled that previous issues of this standard work of reference covered periods of three years only. In the new issue it has been possible to incorporate statistics which were secret during the war years. As data for 1945 were not entirely available at the time of going to Press, a further volume including the years 1945 to 1947 will be published at the end of this year. This issue contains 380 pp. and gives statistics of the production, imports and exports of over 50 minerals and metals. For copper, lead, tin and zinc, tables are included showing the production of ore in terms of metal in addition to smelter production. The section on coal, which occupies 27 pp., deals also with coke, briquettes and the chief coal by-products, and that on petroleum (40 pp.) is concerned with crude petroleum, natural gasoline, natural gas, asphalt, oil shale and the chief refinery products, i.e., motor spirit, kerosene, gas oil, fuel oil, etc. The iron and steel section (25 pp.) gives the world's production of iron ore, pig iron including ferro-alloys, and steel; in addition, further tables are included sub-dividing these into various categories. The import and export tables include the chief semi-manufactures and in many cases the principal chemicals and their derivatives.

* * *



The Saunders diaphragm valve, which attracted interest at the B.I.F., largely on account of its immunity from attack by corrosive fluids and the capacity of not contaminating passing fluids

It is unwise to pass judgment on Vol. 1, No. 1 of any periodical. The new *FPA Journal*, published by the Fire Protection Association, exhibits reasonable careful planning and layout, and good typography and will be welcomed as another means of serving a very useful cause, the preservation of national assets against the risks of fire. It may perhaps be objected, however, that the *FPA Journal* could serve the general aim more effectively did it devote less space to descriptions of past conflagrations and their effects and concerned itself more intimately with the technique of fire-prevention. This subject does, of course, receive some attention but if it is dealt with in greater detail in future issues the new journal will commend itself to nearly all industrial managements.

* * *

The Sklenar Furnace & Manufacturing Co., 38 Memorial Drive, Cambridge 42, Mass. has issued a publication describing in detail the functions and the scope of an improved reverberatory furnace. This uses an entirely new process in the melting of all kinds of metals and is said to be capable of effecting large savings in time, fuel and labour and to reduce metal loss. Photo-diagrams show the principle and tables show the melting rates and capacities.

* * *

Increasing interest in the development and application of powder metallurgy is evidenced by "Metal Powder Report," which is published monthly by Powder Metallurgy, Ltd., 1-19 New Oxford Street, W.C.1. This publication circulates privately among a limited number of subscribers, the subscription rate being £3 7s. 6d. per annum. Regular features include manufacture of powders, pressing and sintering practice, products, fundamentals of powder metallurgy. Subject matter takes the form of papers by specialists from various countries, often in the form of direct reports on actual laboratory experiments.

British Oxygen Research

In a reference to his company's research activities, Mr. S. J. L. Hardie, chairman of the British Oxygen Co., Ltd., speaking at the 62nd ordinary annual general meeting in London recently, said the research works had been engaged for a year on a programme of research and development in the low temperature field, and in the chemical field allied to his company's activities. It was also closely co-operating in research with various Government services and with the coal, steel, oil and chemical industries in the use of medium purity oxygen.

Italian Glass Industry

Rice Chaff Substitute for Silicate Sand

THE Italian glass industry comprised pre-war nearly 500 factories employing about 20,000 men, and producing about 450 varieties of glass for over 35,000 kinds of glass articles. During 1939, output reached nearly 200,000 tons, including 150 million sq. ft. of window and plate glass, 97 million sq. ft. of which were exported. The war inflicted considerable damage upon seven modern factories engaged in the manufacture of plate glass, but the work of reconstruction was carried out with such alacrity that by 1946 about 85 per cent of the pre-war efficiency was reached. Now production of window and plate glass is tending to exceed the pre-war level. It is estimated that the country needs some 580 million sq. ft. of window panes. Factories at Fidenza and at Pisa are producing special types of ultra-transparent and highly resistant glass, such as Duralux, Iperfan, Discolith, Capelux, Planilux, which are used with great success in architectural work.

Still Importing

Exports have been very small, although some glass has been sent to British Central Africa, India, South Africa, Switzerland, and the U.S.A. At the same time a considerable quantity has been imported from Belgium, Czechoslovakia and Luxembourg. A statistical table covering the exports and imports of glass during the first eleven months of 1947 showed that exports amounted only to about one-half of imports.

The chief problem of the Italian glass industry is to secure raw materials. About 180,000 tons of silicate sand, 180,000 of sodium carbonate, and some 70,000 tons of fire-earth are needed yearly. There is plenty of indigenous silicate sand, but it is difficult to find varieties sufficiently free from iron oxide, which is needed for finer glass.

High Purity

In this respect the studies of Dr. V. Chioffi are of great interest. This Italian scientist is seeking to utilise the chaff of rice plants. The ashes of this chaff consist of about 95 per cent silicon of remarkable purity; only 0.01 per cent of Fe_2O_3 and negligible traces of Al_2O_3 ; such a low Fe_2O_3 content makes it eminently suitable for the manufacture of fine, optical and other special glass. As the production of rice in Italy amounts to some 700,000 tons, there are available about 140,000 tons of chaff yielding 25,000 tons of silicon ashes.

Scientific Relations

Committee for Foreign Affairs

THE Lord President of the Council, on the advice of the Advisory Council on Scientific Policy, has approved the setting up of an Inter-departmental Committee on Overseas Scientific Relations to consider and advise on questions of United Kingdom Government policy on matters of overseas scientific relations. The chairman is Sir Edward Appleton and, in addition to representatives of Government departments, the membership will include the Foreign Secretary of the Royal Society, representative of the British Council and of the Conference of Research Associations, and two university scientists. The secretary of the committee is Mr. H. L. Verry, head of the Overseas Liaison Division, Department of Scientific and Industrial Research, 15 Piccadilly, London, W.1.

NEXT WEEK'S EVENTS

MONDAY, MAY 24

Electro Depositors' Technical Society. Northampton Polytechnic, St. John Street, Clerkenwell, E.C.1, 6.0 p.m. Spring meeting. A. Smart and F. H. Smith: "Continuous Electroplated Steel Strip and Sheet."

TUESDAY, MAY 25

Society of Instrument Technology. Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, W.1., 6.30 p.m. Annual general meeting. J. K. Burkitt: "Proposed System in Instrumentation Symbols."

WEDNESDAY, MAY 26

Society of Chemical Industry. (Chemical Engineering Group). Rooms of the Geological Society, Burlington House, Piccadilly, W.1. 5.30 p.m. Annual general meeting.

North Western Fuel Luncheon Club. Engineer's Club, Albert Square, Manchester 12 noon. Third annual session meeting. Dr. G. M. Lees: "The Exploration for Oil in Great Britain."

FRIDAY, MAY 28

Society of Chemical Industry (Food Group) and Royal Sanitary Institute. Royal Hall, Ripon Road, Harrogate, 10 a.m. Dr. J. G. Davis, H. J. Banker, D. H. F. Clayson and D. W. Cha: "The Cleaning and Sterilising of Plant in the Food and Drink Industry."

Chemical Society. (Eire Section). Department of Chemistry, Trinity College, Dublin 7.45 p.m. Dr. A. E. Gillam: "Absorption Spectra as Chemical Tools." (Exeter Section). Washington Singer Laboratories, Prince of Wales Road, Exeter, 4.30 p.m. Prof. M. Stacey: "Advances in Immuno Chemistry."

Home News Items

Brotherton Trust Grants.—Charitable and educational organisations on Merseyside will benefit by a gift of £9800 which has been made by the Charles Brotherton Trust. The trust was created in 1940 by Mr. Charles F. R. Brotherton, chairman of Brotherton & Co., Ltd., Leeds.

Empire's Largest Blast-furnaces.—Two blast-furnaces, each capable of producing 1000 tons of pig-iron per day, are being designed for the Cleveland works of Dorman, Long & Company by Head Wrightson & Company, of Thornaby. These furnaces will be the largest in the British Empire.

Steelworks Development.—A decision to install coke ovens and blast furnaces at Shotton, Cheshire, concurrently with the erection of the £4 million steelworks for John Summers and Sons, is disclosed in the statement to be submitted by the chairman, Mr. R. F. Summers, to the annual meeting on May 26.

Oil Works Blaze.—Damage estimated at about £4000 was caused to property, stock and machinery by a fire at the Eagle Oil blending works of E. S. Lord, Ltd., Bury Road, Rochdale, last week. The fire brigade was able to save most of the ground floor and its contents and the greater portion of the mixing room.

Waiting for Telephones.—Despite the installation of 624,809 telephones last year, the Post Office reports that the number of applicants is increasing rapidly and at present over 450,000 applicants are still on the waiting list. Many of these demands for service cannot be met because at 136,000 cable distribution points all wires are in use.

Dismissal Notices Cancelled.—The threatened stoppage of a number of employees of the Alloa Glasswork Co., Ltd., as a result of curtailed production due to the soda ash shortage (The Chemical Age, May 1) has now been averted. The firm has received a further allocation from the BoT of 25 tons of soda ash per week and has been promised additional supplies as soon as possible.

Record Whale Catch.—After a seven months' whaling season in the Antarctic, the seven ships attached to the *Southern Venturer*, had a record trip, resulting in the discharge of a cargo of whalemeat and oil valued at more than £1.5 million. The seven ships attached to the *Southern Venturer* had a record trip, resulting in a yield of 200,000 barrels of whale and sperm oil and 2700 tons of whalemeat.

German Plant Offered.—Part of the plant operated by Aluminium Werke, G.m.b.H., Rheinfelden, has been listed in the French occupation zone of Germany for disposal as reparations. Manufacturers in this country interested in acquiring such equipment should communicate with the Ministry of Supply (G5E) Shell Mex House, London W.C.2.

Costly Conversion to Oil Burning.—In his annual report to the shareholders of the Hammill (Kent) Brick Company last week, the chairman, Mr. G. V. Parker disclosed that the firm converted its kiln to operate on an oil-burning system in response to the Government's appeal to save coal. Immediately the new plant was in operation, he said, the price of fuel oil was increased and company officials estimate that if they had ignored the Government's request a saving of £10,000 would have resulted.

NEW FURNACE DESIGNS

A NEW and original design for a furnace for shell boilers is mentioned in a recent issue of "Smokeless Air," the official journal of the National Smoke Abatement Society. The furnace is trough-shaped to provide a deep and hot fire with the greatest combustion space above. Beneath the centre of the grate there is an air box containing openings which are controlled by sliding shutters. Air is thus permitted to pass to the main firegrate which consists of loose transverse firebars set at an angle, the air spaces being of nozzle shape.

Air dampers regulate secondary air delivered at the sides of the fire, and enable a quarter of the grate area to be cut off completely when desired. Combustion is stated to be chiefly by gasification of the fuel, but partly by the secondary air supply in a state of great turbulence. It is claimed that even with difficult fuels, combustion is smokeless, CO₂ being present up to 14 per cent, and CO non-existent.

Aluminium Pit Props.—Aluminium beams, now being used in the U.S.A. as roof supports in coal mines, are stated to be highly resistant to the acid water found in the pits. Mine officials speak well of their lightness and strength; a four inch beam weighs only 5 lb. per foot, so that fewer men are required to handle the supports, which can be used repeatedly.

German and Japanese Technical Reports

THE following are among the latest German and Japanese Technical Reports, copies of which are obtainable from H.M. Stationery Office at the prices quoted.

BIOS 1033. Oil fields investigation, Italy (12s.).

BIOS 1370. Viscose manufacture with special reference to the accelerated ageing of alkali-cellulose. Interrogations of Dr. Lakatos (1s. 6d.).

BIOS 1410. Production of titanium oxide at Aussig. Interrogation of Herr Walter Neumann (1s.).

BIOS 1476. Utilisation of blast furnace slag in Germany (17s. 6d.).

BIOS 1541. German metal-spraying techniques (8s.).

BIOS 1546. Manufacture of chrome chemicals by I.G. at Leverkusen and Uerdingen (4s.).

BIOS 1587. Drying and filtration in the German chemical industry (20s.).

BIOS 1563. Pilger mills of the German steel tube industry (4s. 6d.).

BIOS 1571. Tall oil: equipment and method of refining and esterification at the Spangenburg Werke, Hamburg/Eiderstedt (2s.).

BIOS 1574. The manufacture of luminescent zinc sulphides in Germany (2s. 6d.).

BIOS 1693. Progress in microchemistry in Germany (5s. 6d.).

BIOS 1627. German organic and inorganic photographic chemicals manufacture (7s. 6d.).

BIOS 1635. Manufacture of sulphuric acid. The Nievenheim and Busbach-Munsterbusch Factories of Stollberger Zink A.G. fur Bergbau und Huttenbetrieb (2s. 6d.).

BIOS 1656. Extrusion of light alloys at I.G. Farbenindustrie, Bitterfeld. Interrogation of Herr K. F. Brauning (10s.).

BIOS 1672. Thermal measuring instruments. Thermostats and associated apparatus (6s.).

BIOS 1701. Pharmaceuticals—tableting, ampouling and packing in selected German factories (25s.).

BIOS 1705. The German ceramic industry (25s.).

BIOS 1722. Additional information concerning the Fischer-Tropsch process and its products (20s.).

BIOS 1725. Synthetic aromatics, perfumes, isolates and their derivatives (9s.).

BIOS 1729. Cellular rubber and plastics (20s.).

BIOS 1736. Interrogation of Dr. Engelhardt, research chemist of I.G. Farbenindustrie, on the production of synthetic waxes,

nibren and clophen (chlorinated naphthalene and chlorinated diphenyl) (2s.).

BIOS 1737. Continuous chlorination of benzene process at I.G. Farbenindustrie, Bitterfeld and Wolfen, for manufacture of paradichlor benzene as primary product. Interrogation of Dr. Richard Klar (1s.).

BIOS 1742. Sodium perborate and hydrogen peroxide at Falkenau Czechoslovakia. Interrogation of Herr Walter Neumann (1s.).

BIOS MISC. 25. The German soap industry (5s.).

BIOS MISC. 26. Production of synthetic fatty acids (3s.).

BIOS Misc. 68. Problem of dephenolisation of waste liquors (3s. 6d.).

BIOS/MISC. 70. Manufacture of porous stones used in Walter hydrogen peroxide catalyst (M.P.14) (1s.).

BIOS/MISC. 71. German diesel fuel (3s.).

BIOS/JAP/PR/843. The aluminium and magnesium fabricating industries in Japan proper (1s. 3d.).

BIOS/JAP/PR/1665. Molybdenum in Japan (2s. 6d.).

BIOS/JAP/PR/1718. Tungsten resources of Japan (3s.).

FIAT 729. The German high temperature coal tar industry (15s.).

FIAT 731. Technology of aluminium and aluminium alloy production in Germany including early fabrication and recoveries from scrap (12s.).

FIAT 889 (Supplement). Urea manufacture at the I.G. Farbenindustrie Plant, Oppau (1s.).

FIAT 921. Manufacture and purification of arc acetylene (13s.).

FIAT 926. The manufacture of butyne diol (and certain related materials) from acetylene and formaldehyde (5s. 6d.).

FIAT 938. Gasification of coal (4s.).

FIAT 978. English translation. The synthesis of acrylamides and the copolymerisation of acrylamides and butadiene (1s. 6d.).

FIAT 984 (Supplement No 1). Manufacture of phthalic anhydride by I.G. Farbenindustrie (1s. 6d.).

FIAT 1079. The production of acetylene from methane in a regenerative furnace. Ruhrchemie Aktiengesellschaft, Oberhausen-Holten (5s.).

FIAT 1125. Manufacture of acrylonitrile by addition of hydrocyanic acid to acetylene (2s.).

FIAT 1307. Manufacture of oxalic acid (1s. 6d.).

FIAT 1308. Process for the manufacture of beta-oxynaphthoic acid, sodium salt (1s. 6d.).

Overseas News Items

N.E.I. Rubber Exports Up.—Exports of rubber from the Netherlands East Indies in February totalled 16,550 tons, as against 13,360 tons in January.

Cement Factory.—A cement factory is to be erected in Trinidad with an initial capacity of 60,000 tons per annum; it is expected to be in production within two to three years.

U.S. Science Centenary.—The American Association for the Advancement of Science is to celebrate its centenary this year. The event will be marked by a special meeting at Washington, D.C., from September 13-17.

Cement Quota.—The Argentine Government has authorised the importation of 500,000 tons of cement as a reserve for requirements under the national five-year plan, pending the expansion of output by the local cement industry.

Malayan Tin Revival.—Nearly 400 Chinese tin-mines in Malaya have now begun operations with the help of loans, although some are not yet in production, according to the Chinese Tin Mines Rehabilitation Board. The majority of these are gravel pump mines, but there are a few hydraulic-worked and open-cast mines.

Rhodesian Iron.—The first pig iron to be produced in Southern Rhodesia from native ore has lately been tapped from the blast furnace of the Rhodesian Iron and Steel Commission, Que Que steel works. During the next 12 months, the furnace is expected to yield 40,000 tons of iron. Production of steel is to commence shortly.

Six-Day Symposium.—More than 100 scientists and engineers are contributing to the six-day symposium to be organised by the American Society of Chemical Engineers at Milwaukee on May 31. The subjects include engineering in relation to peacetime uses of atomic energy, rocket power plants and technology of pulverised coal burning.

Rising Aluminium Figures.—During 1947 24,057 tons of aluminium ingots (salvaged metal excepted) were produced in Italy. The activity was marked by irregularity caused by fluctuation of supplies of electric power. Starting with some 500 tons in January, it rose rapidly to over 3500 tons in July and then declined steadily until December in which month only about 1000 tons were produced. This output is still remote from the record figure of 48,195 tons reached in 1941, but is a big improvement of the 1946 figure of 10,629 tons.

Czech Coal Deposits.—Promising new coal deposits said to have been found near Modry Kamen, in Slovakia, are believed to be an extension of the rich Hungarian coal fields at Shalgotaryan.

U.S. Standards.—A contemporary list of all national standards approved by the American Standards Association is now available free of charge from the ASA, 70 East 45th Street, New York 17, N.Y.

Still More Bauxite.—Bauxite production in British Guiana continues at a high level; exports to the end of March, 1948, were 330,553 tons compared with 279,197 tons in the same period of 1947.

Brazil to Make Tinplate.—The manufacture of tinplate in Brazil will be commenced this year at the Volta Redonda steel plant, where annual production may eventually reach 40,000 tons, equivalent to 60 per cent of last year's imports.

"Saran."—Rights relating to the trademark "Saran," which the Dow Chemical Company has surrendered in the U.S.A., will be retained in Canada by the Dow Chemical Company of Canada, Ltd. In the U.S.A. the name is now used as a generic term for vinylidene chloride copolymers.

Canadian Production of Paints.—Manufacturers of paints and varnishes in Canada reported production worth \$56,729 m. in 1946, compared with \$48,896 m. in 1945. Works in Ontario accounted for approximately 47 per cent of the total production and establishments in Quebec for about 38 per cent.

Fiji to Help Relieve Fat Shortage.—A Colonial Office report states that all villagers in the Fijian provinces have been asked to plant as many coconuts as possible to assist in easing the world fat shortage. A minimum of 250 nuts per man has been suggested. All native plantations are to be cleaned in order to make full use of the existing crop and Malayan dwarf nuts will be planted later as supplies come to hand.

Australia to Salvage Pyrites.—Millions of tons of pyrites lying about the Mount Morgan mines in Queensland may be used in the manufacture of sulphuric acid in Australia to save imports from the U.S.A., announces the Australian Government News and Information Bureau in New York. The Queensland Railways Department has been asked to transport 60,000 tons of pyrites from Mount Morgan during the next 12 months; later requirements may quadruple this tonnage.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ASSOCIATED RESIN PRODUCTS LTD.
London, S.W. (M., 22/5/48). April 13, deb. to Barclays Bank Ltd. securing all moneys due or to become due to the Bank, general charge. *Nil. January 12, 1948.

BRITISH ALUMINIUM CO. LTD.,
London, E.C. (M. 22/5/48) March 30, feu charter by trustees of late W. Dawson with consent, granted in implement of a Trust Deed dated July 30, 1947; charged on piece of ground part of lands and farm of Cobble-
rae and Langlees, Falkirk, *£3,135,559. April 11, 1947.

Company News

The name of **Joy Domestic Products, Ltd.**, Premier Works, Meadow Road, Reading, has been changed to **Craven Neill & Pilley, Ltd.**, as from April 9, 1948.

The nominal capital of **Actid, Ltd.**, 37-41 Gracechurch Street, London, E.C.3, has been increased beyond the registered capital of £100, by £2400, in £1 ordinary shares.

The nominal capital of **L. Slack & Son, Ltd.**, Glenview Works, Courthouse Street, Pontypridd, has been increased beyond the registered capital of £4000 by £6000 in 5s. ordinary shares.

The nominal capital of **Hickson & Welch, Ltd.**, Ings Lane, Castleford, has been increased beyond the registered capital of £10,000 by £100,000 in £1 5 per cent cumulative preference shares.

The nominal capital of **William Pearson, Ltd.**, 172 Buckingham Palace Road, London, S.W.1, has been increased beyond the registered capital of £40,000, by £20,000, in £1 "B" deferred shares.

British Alkaloids, Ltd., manufacturers of T.C.P., etc., announces a final dividend of 55 per cent, less tax, on its ordinary capital for the year ended March 31, making 80 per cent for the year. Last year total dividends amounted to 100 per cent. Profits amounted to £104,600 compared with £153,500 for the previous year.

Tintex Dyes, Ltd. has declared a gross trading profit of £29,864 for the year ended September 30, 1947 (£26,399 in 1946). On the basis of estimated profits for the six months ended March 31, 1948, an interim dividend of 7½ per cent is recommended.

Bryant and May, Ltd. is reducing the final ordinary dividend by 2½ per cent to 8 per cent tax free, and a final dividend on the partnership stock of 5 per cent (same) tax free. Employees' proportion of profits is given at £59,835 as against £57,038.

New Companies Registered

Corela (London), Ltd. (453,816).—Private company. Capital £500. Manufacturing chemists, manufacturers of salts, acids, etc. Norah Redfern is the first director. Reg. office: 80b Dean Street, W.1.

Archway Laboratories, Ltd. (453,217).—Private company. Capital £1000. Manufacturers, export and import merchants of chemicals, gases, drugs, medicines, etc. Solicitors, Mendes da Costa, Greenwood & Co., 70 Finsbury Pavement, E.C.2.

Chemical Producers, Ltd. (453,153).—Private company. Capital £100. Manufacturers of chemical products, cleaning materials, drugs, fertilisers, oils, colours, etc. Directors: W. G. Lock, and D. Miles. Reg. office: 2 York Street, Twickenham.

Venner & Stone Co., Ltd. (453,912).—Private company. Capital £700. Importers, exporters of fertilisers, calcium carbonate and general chemicals, etc. Directors: J. W. H. Verner and B. C. Stone. Reg. office: 316 Vauxhall Bridge Road, S.W.1.

Patersons Cleansel, Ltd. (26,252).—Private company. Capital £120,000. Manufacturing, wholesale and retail chemists and druggists, chemical engineers, etc. Directors: J. L. Hardie, and W. R. Clarkson. Reg. office: 145 St. Vincent Street, Glasgow.

Chemical and Allied Stocks and Shares

BECAUSE business has been restricted by Palestine uncertainties and the Labour Party conference, stock markets have proceeded cautiously, although generally the undertone was firm, following further improvement in British Funds. The latter reflects satisfaction with terms of the Australian conversion loan, and, moreover, it seems that much of the money arising from the sale of the Argentine railways is being reinvested in gilt-edged.

Shares of chemical and kindred companies have been fairly steady, but movements

generally did not exceed more than a few pence. Imperial Chemical eased slightly to 49s. 9d. on attention drawn to the group's big plans for the future, which in due course will require more capital. British Oxygen at 99s. 4½d. have been steady. This is another company which will have to raise further capital as time proceeds. Monsanto Chemical 5s. shares have remained at 60s., at which the yield is slightly under 3½ per cent on the basis of last year's 45 per cent dividend. The moderate yield reflects confident expectations that there are prospects of higher dividends; but this must, of course, await the end of the voluntary dividend limitation. Laporte Chemicals 5s. ordinary were 21s. 10½d., and the new shares at a premium of around 2s. 6d.

In other directions, Albright & Wilson 5s. shares were 31s. 6d. and Greiff-Chemicals Holdings 5s. shares changed hands around 15s. Firmness at 51s. 3d. was shown by British Aluminium, but elsewhere, British Glues & Chemicals 4s. shares eased to 24s. 3d. and British Match at 40s. 6d. remained dull, pending the dividend announcement. Awaiting the Government's decision on re-opening the London Metal Exchange, Amalgamated Metal shares have eased to 21s. 9d. Among shares of companies interested in plastics, De La Rue rallied to 47s. the yield of over 5 per cent bringing in buyers. British Xylonite were £6½ and British Industrial Plastics 2s. shares changed hands around 8s. 3d.

Iron and steel shares were steady, although cautious earlier in the week when the tendency was to await statements at the Labour Party Conference as to the Government's future nationalisation plans. Dorman Long were 32s., Colvilles at 32s. 6d. responded too on the full report, United Steel were 30s. and Stewarts & Lloyds 56s. 6d., Babcock & Wilcox at 74s. 9d. have remained under the influence of the past year's results and the strong balance-sheet position.

In other directions, Turner & Newall were 77s. 6d., United Molasses strengthened to 51s. 9d. and the 5s. units of the Distillers Co. to 28s. 3d. Associated Cement (74s.) have firmed up on the annual report, and British Plaster Board 5s. shares were 24s. 7½d. Goodlass Wall at 38s. 6d. have made response to the past year's big profit increase, although owing to dividend limitation, shareholders do not benefit, their payment being again 15 per cent. Dunlop Rubber at 73s. 9d. eased slightly, although the market expects the forthcoming results to show a further increase in profits.

Boots Drug were firmer at 53s. 6d., British Drug Houses 5s. shares strengthened to 12s. after easing earlier, Beechams deferred were 21s. 3d. and Sangers 35s. 3d. Oil shares displayed uncertainty owing to the Palestine

developments. Anglo-Iranian eased to £8½, before a rally to £8½, Shell were 77s. 6d., and later 78s. 9d., V.O.C. recovered to £6½, although Ultramar Oil were active up to 83s. 1½d., news from the company's property being expected in a few weeks.

British Chemical Prices

Market Reports

ACTIVE conditions are again reported on the chemicals market and the demand for home trade and shipment continues on substantial lines. Buying, too, has been fairly widespread and not restricted to any one section, although the bulk of the business so far as the home industry is concerned has been for nearby delivery dates. Actual quotations show little change from recent levels but a whole range of articles are now subject to the 1½ per cent reduction recently notified by I.C.I. A similar allowance has been made by other producers of caustic soda, sodium silicate and potassium silicate. The call for white and red lead has been fully up to the quantities on offer, and a good demand has been in evidence for the barium and copper compounds. The solvents continued in active request while there has been no lessening of interest in such products as formaldehyde, borax, sulphur, and arsenic. Nothing fresh falls to be recorded on the coal-tar products market and the extent of business is mainly a question of supply.

MANCHESTER.—In consequence of the Whitsuntide holidays, which have resulted in stoppages of varying periods at the textile mills and other consuming establishments, quieter trading conditions have been reported during the past week in virtually all sections of the Manchester chemical market and this has been reflected not only in the amount of new business placed, but also in the movement of supplies against delivery specifications. In light and heavy chemicals, as well as in fertiliser material and in tar products, a quick resumption of trading activity is looked for by the end of this week.

GLASGOW.—Business in the Scottish chemical market continues to be on a reduced scale, although the position has not deteriorated during the past week. Towards the end of the week there were, in fact, slight signs of improvement. It remains to be seen whether a steady improvement will be maintained during the coming week. Sodium chlorate has been in particular heavy demand and supplies have been practically non-existent. In the export market inquiries have been on a reduced scale, however, a greater proportion of inquiries received now lead to orders.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2 at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Production of vinyl halide resins.—Distillers Co., Ltd., J. J. P. Staudinger and B. K. Kelly. May 20, 1943. 600,904.

Solvent stable phthalocyanine pigments.—Ltd., J. J. P. Staudinger and M. D. Cooke. May 20, 1943. 600,905.

Process for the regeneration of catalysts used in reforming hydrocarbons.—Standard Oil Development Co. Sept. 19, 1942. 600,802.

Production of piezo-electric crystals.—Bendix Aviation Corporation. Oct. 6, 1942 (Addition to 600,190.) 600,909.

Solvent stable phthalocyanine pigments.—American Cyanamid Co. March 12, 1943. (Cognate Application 5722/44.) 600,911.

Alkamine esters of 2, 5-diarylpyrrole-3, 4-dicarboxylic acids.—American Cyanamid Co. July 31, 1943. 600,807.

Trip mechanisms for metal-working machines.—Waterbury Farrel Foundry & Machine Co. and R. L. Wilcox. July 11, 1944. 600,808.

Alkyl ester copolymers.—American Cyanamid Co. Aug. 17, 1943. 600,916.

Lubricating oil compositions.—American Cyanamid Co. Aug. 28, 1943. 600,810.

Gas analysers.—L. L. Vayda and J. A. Stein. Sept. 5, 1944. 601,018.

Emulsion polymerisation.—American Cyanamid Co. and E. L. Kropa. Sept. 5, 1944. 600,917.

Regeneration of catalysts used in reforming hydrocarbons.—Standard Oil Development Co. and C. Arnold. Sept. 20, 1944. (Addition to 600,802.) 600,813.

Resin emulsions.—Johnson & Johnson (Great Britain), Ltd. Dec. 24, 1943. 600,924.

Preparation of alkaline earth metal salts of alkyl phenol sulphides.—J. C. Arnold (Standard Oil Development Co.). Jan. 16, 1945. 600,825.

Aluminothermic or like exothermic process for making non-ferruginous alloys.—E. Lux. Jan. 22, 1945. 600,927.

Producing sintered, shaped bodies from powdery ferrous material.—American Electro Metal Corporation. Feb. 11, 1944. 600,829.

Protein-polyphosphates and to coatings and solutions thereof and to methods of preparing the same.—Albright & Wilson, Ltd. April 8, 1944. (Cognate Application 8721/45.) 600,933.

Manufacture of materials resistant to or active against micro-organisms.—Nipa Laboratories, Ltd., E. Boehm and R. Williams. May 3, 1945. 600,834.

Method of extraction of vanadium from bauxites and manufacture of ferro-vanadium.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges & Camargue. April 28, 1942. 600,833.

Production of anisole.—P. Spence & Sons, Ltd., N. M. Cullinane and W. C. Davies. June 7, 1945. 600,837.

Production of hexamethylbenzene.—P. Spence & Sons, Ltd., N. M. Cullinane and W. C. Davies. June 7, 1945. 600,838.

Production of nuclear methylated phenols from anisole.—P. Spence & Sons, Ltd., N. M. Cullinane and W. C. Davies. June 7, 1945. 600,839.

Process of preparing finely divided products applicable to dyestuffs and pigments.—Manufactures de Produits Chimiques du Nord Etablissements Kuhlmann. Dec. 4, 1941. 600,944.

Process for the conversion of hydrocarbon oils.—J. C. Arnold (Standard Oil Development Co.). June 12, 1945. 600,840.

Alloys.—New Jersey Zinc Co. Aug. 26, 1944. 601,027.

Processes of producing substituted acridines.—E. Lilly & Co. June 29, 1944. 600,841.

Method of producing acid Bessemer steel or Thomas steel low in nitrogen.—Fagersta Bruks Aktiebolag. July 10, 1944. 601,028.

Aluminium solder.—W. Martin. June 20, 1945. (Cognate Application 671/46.) 601,029.

Gas-turbine power-plants.—Bristol Aeroplane Co., Ltd., and F. M. Owner. June 21, 1945. 600,946.

Production of substituted propyldiamines and particularly their acridine compounds.—E. Lilly & Co. Aug. 7, 1944. 600,851.

Making of glass.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey. June 7, 1944. 600,958.

Impregnation of wood with urea-formaldehyde resins.—E. I. Du Pont de Nemours & Co. Sept. 20, 1944. 600,961.

Process for the separation of suspended carbon from aqueous acid solutions.—C. Arnold (Standard Oil Development Co.). Sept. 24, 1945. 600,858.

Process for the manufacture of indene and indane compounds.—F. Hoffmann-La Roche & Co. Akt.-Ges. Nov. 20, 1944. 600,985.

Process of preparing butyrolactones.—A. Abbey (E. Lilly & Co.). Oct. 12, 1945. 600,865.

Manufacture of 1:4:3:6-dianhydrides of mannitol and sorbitol.—W. N. Haworth and L. F. Wiggins. Oct. 17, 1945. 600,870.

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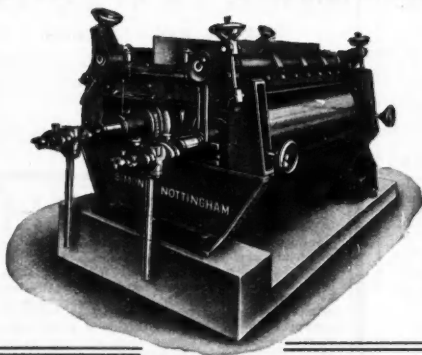
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21 Years' Service

Friends of the Boys' Hostels Association

RECOLLECTIONS of 21 years' devoted service by many individuals to poor boys in the East End of London were recalled at a recent dinner at the Mansion House, at which the Lord Mayor of London (Sir Frederick Wells) presided, which commemorated the anniversary of the Boys' Hostels Association.

Lord Elton, proposing the toast of "The Boys' Hostels Association," said the presence of the Lord Mayor and Lady Mayoress was evidence of its growing importance. The association had many claims, not least, as might be expected from an organisation whose chief was Sir Ernest Benn, the fact that it treated the individual as an individual. "It is surely serving an indispensable social purpose," declared Lord Elton.

The Other Poverty

Sir Ernest Benn responding, said that 21 years ago the work began at John Benn House under the initiative of Dr. J. J. Mallon, who, happily, was with them that night. In those days they were dealing literally with material and moral "down-and-outs." There was then a poverty of a kind that did not exist to-day and the problem had, therefore, somewhat changed in its character. Thanks to the arrangements, about which they all had their own opinions, that problem of relieving poverty and hunger, did not exist for the moment, but he was not at all sure that the moral "down-and-out" had been so successfully dealt with as the material "down-and-out."

Sir Ernest said they boasted of between 400-500 old boys, most of whom were successful in life. Many of them were in responsible positions, and some in great positions. The work had in the past enlisted the support of such people as Lord Leverhulme, as president, and of the Prince of Wales, who was so impressed with the work that he provided £75,000 through King George's Trust. "We are ready for a great extension of this essential work," said Sir Ernest, "and for that purpose we must re-double our efforts and increase our resources."

Mr. J. F. Wolfenden, Headmaster of Shrewsbury School, gave the toast of "The London Boy," and Mr. Roy W. Lewis, responding on behalf of the Hostels Old Boys' Association, asked Sir Ernest to accept a framed, illuminated address on vellum from the boys and old boys to mark the 21st birthday of John Benn House.

The toast of "The Guests" was proposed by Viscount Leverhulme and replied to by Lord Iliffe, who wished the association continued success in the years ahead. Donations at the dinner totalled £1880.

Road Tar Technology

Information Film Released

ALTHOUGH the surface dressing of roadways is a comparatively simple technical process, research has established that if the average life of the dressings could be prolonged by only one year there would be an annual saving in this country of about £3 million. The Road Research Association, together with experts in the tar industry, has for many years been engaged in investigation of the various factors which determine the life of road surfaces. This aspect of road maintenance, together with other interesting features, receives full treatment in a film entitled, "Surface Dressing with Tar," produced by the COI and the Department of Scientific and Industrial Research in conjunction with the British Road Tar Association. The film was given its premiere recently at Cambridge when surveyors and divisional engineers from a wide area attended the showing at the invitation of the Eastern District Tar Board of the British Road Tar Association.

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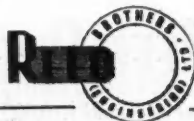
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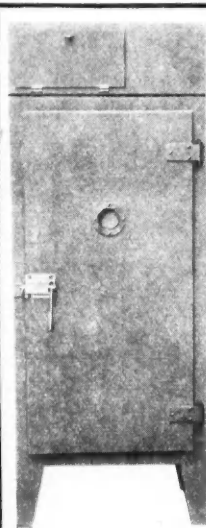
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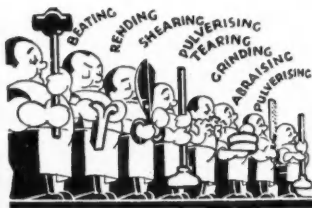
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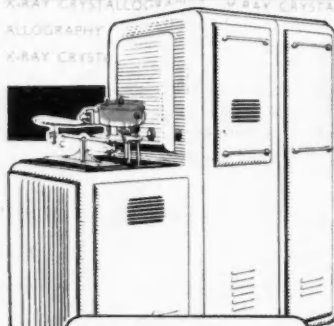
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